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—
1878.

“ Happy is he who lives to understand,
Not human nature only, but explores
All natures,—to the end that he may find
The law that governs each ; and where begins
The union, the partition where, that makes
Kind and degree, among all visible Beings ;
The constitutions, powers and faculties,
Which they inherit—cannot step beyond—
And cannot fall beneath ; that do assign
To every class its station and its office,
Through all the mighty commonwealth of things ;
Up from the creeping plant to sovereign Man.
Such converse, if directed by a meek,
Sincere, and humble spirit, teaches love :
For knowledge is delight ; and such delight
Breeds love : yet, suited as it rather is
To thought and to the climbing intellect,
It teaches less to love, than to adore ;
If that be not indeed the highest love ! ”

WORDSWORTH.

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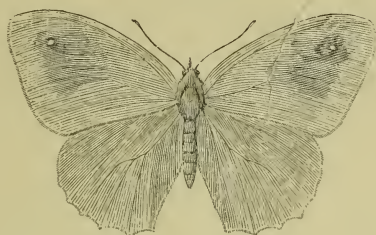
VOL. XI.]

JANUARY, 1878.

[No. 176.]

VARIETY OF SATYRUS JANIRA.

By C. A. BRIGGS.



SATYRUS JANIRA (VARIETY).

THIS remarkable variety of *Satyrus Janira* was captured near Dover, by Mr. W. Purdey, of Folkestone, from whom I obtained it. The specimen is a female, and is in fair condition. Liable as this species is to variation in the depth of its colouring, I do not remember to have ever seen so fine an example of the bleached variety as this. A somewhat similar one, however, is described in Humphrey's 'Genera and Species of British Butterflies,' p. 14.

In the place of the ordinary colouring of the female of this species, the ground colour of the upper surface of the wings in this specimen is of an almost uniform drab, from which the usual orange blotch shows out with singular effect. In typical specimens of *S. Janira* (female) this blotch is the palest portion of the upper surface of the wings. In this variety it is the darkest; and the contrast when the specimen is placed among typical specimens is most striking.

Mr. Purdey informs me its appearance on the wing was so extraordinary as to leave him in doubt of the identity of the species until after its capture.

December 11, 1877.

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A CONTRIBUTION TO THE ENTOMOLOGY OF IRELAND.

By JOHN A. POWER, M.D.

THE insect Fauna of England, Wales, and Scotland, and even that of the adjacent insular appendages, has of late years been so assiduously worked out by very numerous and energetic explorers of every kind, that apparently comparatively little remains to be done as to the discovery of new species of *Lepidoptera*, *Coleoptera*, or *Hemiptera*; although it is true that a persevering search does still turn up a few in the course of the year. The *Lepidoptera* seem nearly exhausted. The *Coleoptera* and *Hemiptera* afford a better chance, especially the latter, which have only been zealously investigated during the last few years, and that by a comparatively small number of entomologists, who have produced a list of species far more extensive than was at first expected. The *Homoptera*, though more limited in number, afford us the best field of discovery; but as yet there are very few workers, and we have scarcely even a satisfactory catalogue, much less description, of those which are known. The list will no doubt be very considerably extended when they have been farther investigated.

It is to be hoped that the smaller chance of success which now attends the mere collector of the *Coleoptera*, of gratifying his ambition to find "something new," will induce him to devote increased attention to the infinitely more useful and scientific study of their habits and life-histories,—a point in which the lepidopterists at present far surpass the coleopterists; though it is true that the habits of many of the *Coleoptera* render the investigation much more difficult. There seems, however, to have been a decided and healthy movement in this respect within the last few years in this country, and still more in America; and we have many most elaborately worked-out life-histories, more particularly of those insects which are hurtful to the crops and food, not omitting that great bugbear of all—"him of Colorado;" yet still very much more is required, and a grand field is in this respect open to the real entomologist.

In Ireland the Flora is, I believe, well worked out, like that of Great Britain; and few, if any, discoveries remain to be made in it; but our knowledge of the insect Fauna is in every branch most imperfect. We have a few, for the most part local, lists of *Lepidoptera*, few or none of *Coleoptera*,

and I believe absolutely none of *Hemiptera* or *Homoptera*. One might suppose from its geographical position, the mildness of the climate, the very considerable extent of area, and the abundance of wild country, where everything natural is not improved off the face of the earth by bricks and mortar or cultivation, that the number of species would be great; and that, especially on the west coast open to the Atlantic, the collector might hope to gratify his ambition for new species. There appears, however, to be a general consent that this is not the case. I am not acquainted with many details from purely Irish entomologists; but the Englishmen who have worked in Ireland have almost invariably been disappointed, and have pronounced the country barren as to new or rare *Coleoptera* from Belfast to Killarney, and from Dublin to Connemara. Such was the report of Professor Babington, long ago, and recently of Messrs. Wollaston, S. Stevens, Champion, &c. They did not attack the *Hemiptera* or *Homoptera*. I am, however, strongly inclined to think that a good deal of this depends on the paucity of the observers, the short time devoted to the excursions, and the limited localities examined. I suspect that if Ireland were to be worked as thoroughly as the sister country, it would not be found so woefully deficient.

On two occasions I have spent about a fortnight in the month of August with some friends in the neighbourhood of Waterford, at a village called Rathkurby, from whence I made excursions to the Cumberagh Hills, Thomas Town, the banks of the Suir, Tramore on the coast, &c.; and on one of these visits, more especially, I amused myself with taking type specimens of *every* species of coleopterous and hemipterous insect I could find, whether common or rare; and the result is the accompanying list of three hundred and thirty-five species of *Coleoptera*, and sixty-four of *Hemiptera*; which I think is not to be despised, as the produce not of a set entomological expedition, but of the leisure hours of a visit to friends. I have supplemented the list by a few additional insects, which I afterwards obtained on a visit to Dublin, where, however, I was scarcely able to collect at all, though I did try the Hill of Howth, the Dublin hills, the Sugar Loaf, and got as far as Ovoca. These I have distinguished by the affix of (D). The list is regularly arranged according to Dr. Sharp's catalogue. It will be seen that of *new* species I got none, and that the rare species were not very many; but yet not so much amiss considering the

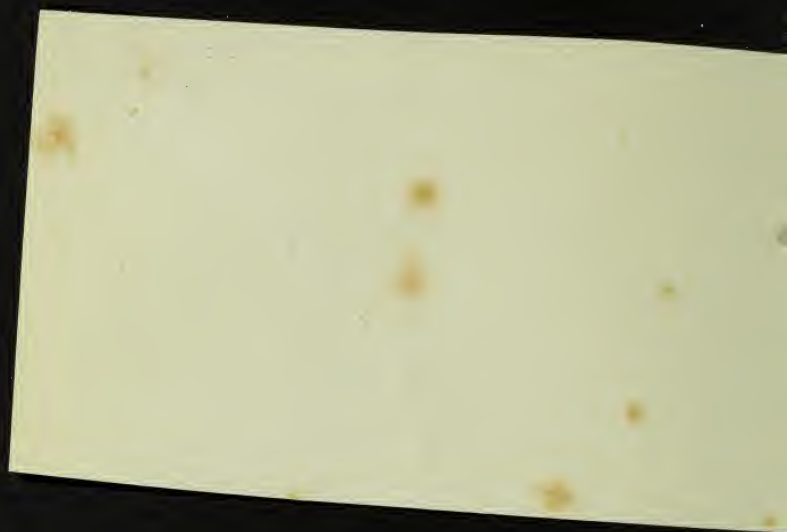
shortness of the time, and the unfavourable period of the year. Some few of them I had not taken before; so that I was well satisfied on the whole.

The absolute number of specimens I caught was very great; there was no deficiency of insect life. Some of the species which I find rare in England were abundant, as *Apion Gyllenhalli*, *Stilicus similis*, *Homalium Allardi*, *Claviger*, *Phyllotreta sinuata*, *Crepidodera ventralis*, *Aphodius porcus*, &c; *Sitones cinerascens* and *Lema Erichsoni* were not uncommon; but many of our most common insects were entirely absent, such as *Cœliodes didymus*, *Ceuthorynchus pollinarius*, *Meligethes rufipes*, *Aphodius rufipes* and *luridus*; of the genus *Onthophagus* there was not one. Every specimen I saw of *Silpha* was unmistakably *subrotundata*; and *Tachyporus obsoletus* was entirely replaced by what is said to be the var. *nitidicollis*. I did not see one specimen of the ordinary type. The *Hemiptera*, with the exception of a few species, were by no means numerous; and amongst them there was not one new or uncommon. The *Homoptera* at that time I knew little or nothing about; but they were not numerous, and the species were few.

IRISH COLEOPTERA.

<i>Nebria brevicollis</i> , F.	<i>Bembidium decorum</i> , Pz. (D.)
<i>Demetrias atricapillus</i> , L.	„ <i>tibiale</i> , Duft. (D.)
<i>Dromius linearis</i> , Ol.	<i>Haliphus obliquus</i> , F.
„ <i>nigriventris</i> , Th.	<i>Brychius elevatus</i> , Pz.
„ <i>melanocephalus</i> , Dj.	<i>Hydroporus picipes</i> , F.
<i>Calathus melanocephalus</i> , L.	„ <i>rivalis</i> Gyll.
<i>Olisthopus rotundatus</i> , Pk.	„ <i>Gyllenhalli</i> , Schisot.
<i>Taphria nivalis</i> , Pz.	„ <i>planus</i> , F.
<i>Pterostichus cupreus</i> , L.	„ <i>pubescens</i> , Gyll.
„ <i>madidus</i> , F.	„ <i>12-pustulatus</i> , Fab.
„ <i>lepidus</i> , F.	„ <i>depressus</i> , F.
<i>Amara spinipes</i> , L.	„ <i>vittula</i> , Er.
„ <i>familiaris</i> , Duft.	„ <i>palustris</i> , L.
„ <i>ovata</i> , F.	<i>Colymbetes bistratus</i> , Berg.
<i>Harpalus punctatulus</i> , Duft. (D.)	<i>Ilybius angustior</i> , Gyll.
„ <i>puncticollis</i> , Pk.	<i>Limnobius truncatellus</i> , Thunb.
„ <i>ruficornis</i> , F.	„ <i>nitidus</i> , Marsh.
„ <i>proteus</i> , Pk. (D.)	<i>Helophorus nubilus</i> , F.
<i>Bradycellus harpalinus</i> , Dj.	„ <i>æneipennis</i> , Thoms.
<i>Trechus minutus</i> , F.	„ <i>griseus</i> , Herbst.
<i>Bembidium obtusum</i> , Sturm.	<i>Hydraena riparia</i> , Kug.
„ <i>lampros</i> , Hbst.	„ <i>nigrita</i> , Germ.

A Board in the Book



<i>Sphæridium scarabæoides</i> , <i>L.</i>	<i>Quedius fulgidus</i> , <i>Gr.</i>
<i>Cercyon obsoletus</i> , <i>Gyll.</i>	„ <i>tristis</i> , <i>Gr.</i> (D.)
„ <i>hæmorrhoidalis</i> , <i>F.</i>	„ <i>brevicornis</i> , <i>Th.</i>
„ <i>flavipes</i> , <i>F.</i>	„ <i>rufipes</i> , <i>Gr.</i>
„ <i>lateralis</i> , <i>Marsh.</i>	„ <i>semimæneus</i> , <i>Steph.</i>
„ <i>unipunctatus</i> , <i>L.</i>	„ <i>boops</i> , <i>Gr.</i>
„ <i>melanocephalus</i> , <i>L.</i>	<i>Ocypus olens</i> , <i>Mull.</i>
„ <i>pygmæus</i> , <i>Ill.</i>	<i>Philonthus splendens</i> , <i>F.</i>
<i>Megasternum boletophagum</i> , <i>Msh.</i>	„ <i>intermedius</i> , <i>Boisd.</i>
<i>Cryptopleurum atomarium</i> , <i>F.</i>	„ <i>succicola</i> , <i>Th.</i>
<i>Aleochara fuscipes</i> , <i>F.</i>	„ <i>addendus</i> , <i>Sharp.</i>
„ <i>mœsta</i> , <i>Grav.</i>	„ <i>politus</i> , <i>Fab.</i>
„ <i>grisea</i> , <i>Kr.</i> (D.)	„ <i>marginatus</i> , <i>F.</i>
„ <i>algarum</i> , <i>Fauv.</i> (D.)	„ <i>varius</i> , <i>Gyll.</i>
„ <i>obscura</i> , <i>Gr.</i> (D.)	„ <i>fimetarius</i> , <i>Gr.</i>
„ <i>lanuginosa</i> , <i>Gr.</i>	„ <i>cephalotes</i> , <i>Gr.</i>
„ <i>bipunctata</i> , <i>Ol.</i>	„ <i>fucicola</i> , <i>Curt.</i> (D.)
„ <i>nitida</i> , <i>Gr.</i>	„ <i>varians</i> , <i>Pk.</i>
„ <i>morion</i> , <i>Gr.</i>	„ <i>trossulus</i> , <i>Nord.</i>
<i>Myrmedonia limbata</i> , <i>Pk.</i>	<i>Xantholinus glabratus</i> , <i>Gr.</i>
„ <i>canaliculata</i> , <i>F.</i>	„ <i>punctulatus</i> , <i>Pk.</i>
<i>Homalota graminicola</i> , <i>Gr.</i>	„ <i>linearis</i> , <i>Ol.</i>
„ <i>monticola</i> , <i>Th.</i>	<i>Othius læviusculus</i> , <i>Steph.</i>
„ <i> analis</i> , <i>Gr.</i>	„ <i>melanocephalus</i> , <i>Gr.</i>
„ <i>aquatica</i> , <i>Th.</i>	<i>Lathrobium filiforme</i> , <i>Gr.</i>
„ <i>trinotata</i> , <i>Kr.</i>	<i>Stilicus similis</i> , <i>Er.</i>
„ <i>fungicola</i> , <i>Th.</i>	„ <i>affinis</i> , <i>Er.</i>
„ <i>divisa</i> , <i>Mark.</i>	<i>Lithocharis melanocephala</i> , <i>F.</i>
„ <i>ravilla</i> , <i>Er.</i>	<i>Sunius angustatus</i> , <i>Pk.</i>
„ <i>nigra</i> , <i>Kr.</i>	<i>Stenus pusillus</i> , <i>Steph.</i>
„ <i>longicornis</i> , <i>Gr.</i>	„ <i>speculator</i> , <i>Lac.</i>
„ <i>villosula</i> , <i>Kr.</i>	„ <i>unicolor</i> , <i>Er.</i>
„ <i>parva</i> , <i>Sahl.</i>	„ <i>bifoveolatus</i> , <i>Gyll.</i>
„ <i>aterrima</i> , <i>Gr.</i>	„ <i>rusticus</i> , <i>Er.</i>
„ <i>muscorum</i> , <i>Bris.</i>	„ <i>ossium</i> , <i>W. C.</i>
„ <i>fusca</i> , <i>Sahl.</i>	„ <i>impressus</i> , <i>Germ.</i>
„ <i>fungi</i> , <i>Gr.</i>	„ <i>annulatus</i> , <i>Crotch.</i>
„ <i>atramentaria</i> , <i>Gryll.</i>	„ <i>filum</i> , <i>Er.</i>
<i>Oligota inflata</i> , <i>Mann.</i>	„ <i>occulatus</i> , <i>Gr.</i>
<i>Encephalus complicans</i> , <i>Ste.</i> (D.)	„ <i>paganus</i> , <i>Er.</i>
<i>Hypocyptus longicornis</i> , <i>Pk.</i>	<i>Platystethus cornutus</i> , <i>Gr.</i>
<i>Conurus lividus</i> , <i>Er.</i>	<i>Oxytelus rugosus</i> , <i>F.</i>
<i>Tachyporus nitidicollis</i> , <i>Step.</i>	„ <i>laqueatus</i> , <i>Marsh.</i>
„ <i>solutus</i> , <i>Er.</i>	„ <i>sculpturatus</i> , <i>Gr.</i>
„ <i>chrysomelinus</i> , <i>L.</i>	„ <i>nitidulus</i> , <i>Gr.</i>
„ <i>brunneus</i> , <i>L.</i>	„ <i>depressus</i> , <i>Gr.</i>
<i>Tachinus marginellus</i> , <i>F.</i>	<i>Trogophlæus Erichsoni</i> , <i>Sharp.</i>
„ <i>rufipes</i> , <i>De G.</i>	<i>Homalium riparium</i> , <i>Th.</i>

- Homalium Allardi*, Fair.
 „ *fossulatum*, Er.
 „ *cæsum*, Er.
 „ *deplanatum*, Gyll.
 „ *concinnum*, Marsh.
Phlæobium clypeatum, Mull.
Claviger foveolatus, Mull.
Scaphisoma agaricinum, Ol. (D.)
Orthoperus atomus, Gyll.
Sericoderus cateralis, Gyll.
Calyptomerus dubius, Marsh.
Anistoma calcarata, Er.
Colon dentipes, Sahl. (D.)
Choleva tristis, Pz.
 „ *grandicollis*, Er.
 „ *longula*, Kell.
 „ *Watsoni*, Spence.
Necrophorus humator, F.
 „ *ruspator*, Er.
 „ *vespillo*, L.
Silpha subrotundata, Leach. (D.)
Hister carbonarius, E. H.
Onthophilus striatus, F.
Olibrus æneus, F.
Cercus rufilabris, Latr.
Epuræa æstiva, L.
 „ *melina*, Er.
 „ *florea*, Er.
Meligethes æneus, F.
 „ *viridescens*, F.
 „ *picipes*, Sturm.
 „ *erythropus*, Gyll.
Antherophagus pallens, Ol. (D.)
Cryptophagus lycoperdi, Herbst.
 „ *pilosus*, Gyll.
 „ *scanicus*, L.
 „ *dentatus*, Herbst.
 „ *bicolor*, Sturm.
 „ *vini*, Pz.
Atomaria fuscipes, Gyll.
 „ *atricapilla*, Steph.
 „ *fuscata*, Schön.
 „ *munda*, Er.
 „ *apicalis*, Er.
 „ *ruficornis*, Marsh.
Ephistemus gyrinoides, Marsh.
 „ *globulus*, Pk.
Monotoma picipes, Pk.
Lathridius transversus, Ol.
- Lathridius minutus*, L.
 „ *nodifer*, Westw.
Corticaria punctulata, Marsh.
 „ *elongata*, Gyll.
 „ *gibbosa*, Pk.
 „ *fuscata*, Gyll.
Mycetæa hirta, Marsh.
Typhæa fumata, L.
Elmis Volkmar, Pz.
 „ *parallelopipedus*, Müll.
Limnius tuberculatus, Müll.
Aphodius erraticus, L.
 „ *fimetarius*, L.
 „ *porcus*, F.
 „ *rufipes*, L.
 „ *contaminatus*, Hbst.
 „ *merdarius*, F.
 „ *depressus*, Kug., var. nig.
Geotrupes stercorarius, L.
 „ *putridarius*, Er.
Serica brunnea, L.
Helodes minutus, L. (D.)
Anobium striatum, Ol.
Ochina hederæ, Mull.
Cis boleti, Scop.
Octotemnus glabriculus, Gyll.
Salpingus ater, Pk. (D.)
Lagria hirta, L.
Otiorynchus scabrosus, Marsh.
 „ *ligneus*, Ol.
 „ *picipes*, F.
 „ *sulcatus*, F.
Trachyphlæus scaber, L.
 „ *squmulatus*, Ol.
Liophlæus nubilus, F.
Barynotus obscurus, F.
Strophosomus coryli, F.
 „ *retusus*, Marsh.
Sitones flavescens, Marsh.
 „ *sulcifrons*, Thum.
 „ *tibialis*, Herbst.
 „ *Waterhousei*, Walt.
 „ *cinerascens*, F.
 „ *regensteinensis*, Hbst.
 „ *puncticollis*, Steph.
 „ *lineatus*, L.
 „ *hispidulus*, F.
Polydrosus pterygomalis, Sch.
Sciaphilus muricatus, F.

- Liosomus ovatulus*, *Clair.*
Hypera nigrirostris, *F.*
 " *variabilis*, *Herbst.*
Hyllobius abietis, *L.*
Mecinus pyrastrer, *Hbst.*
Anthonomus rubi, *Hbst.*
 " *comari*, *Crotch.*
Orchestes quercus, *L.*
 " *alni*, *L.*
 " *fagi*, *L.*
Rhamphus flavicornis, *Clair.*
Tychius picirostris, *F.*
Nanophyes Lythri, *F.*
Ceuthorynchus assimilis, *Pk.*
 " *erysimi*, *F.*
 " *constrictus*, *Msh.*
 " *ericæ*, *Gyll.*
 " *litura*, *F.*
 " *quadridens*, *Pz.*
 " *sulcicollis*, *Gyll.*
Ceuthorynchideus troglodytes, *F.*
Phytobius 4-tuberculatus, *F. (D.)*
Rhinoncus pericarpus, *F.*
Apion subulatum, *Kirb.*
 " *carduorum*, *Kirb.*
 " *striatum*, *Kirb.*
 " *seniculum*, *Kirb.*
 " *viciæ*, *Pk.*
 " *fagi*, *L.*
 " *flavipes*, *F.*
 " *virens*, *Hbst.*
 " *Gyllenhalli*, *Kirb.*
 " *ervi*, *Kirb.*
 " *pisi*, *F.*
 " *æthiops*, *Hbst.*
 " *loti*, *Kirb.*
 " *vorax*, *Hbst.*
 " *miniatum*, *Germ.*
 " *cruentatum*, *Walt.*
 " *frumentarium*, *L.*
 " *violaceum*, *Kirb.*
Bruchus seminarius, *L.*
 " *ater*, *Marsh.*
Pogonocherus pilosus, *F. (D.)*
Lema cyanella, *F.*
 " *Erichsoni*, *Suf.*
Lamprosoma concolor, *Strm. (D.)*
Chrysomela Banksi, *F. (D.)*
 " *staphylæa*, *L.*
Chrysomela polita, *L.*
Phædon tumidulum, *Kirb.*
Adimonia sanguinea, *F.*
Galeruca lineola, *F.*
Haltica longicollis, *All.*
 " *ericeti*, *All.*
 " *pusilla*, *Duft.*
Crepidodera transversa, *Marsh.*
 " *ferruginea*, *Scop.*
 " *ventralis*, *Ill.*
Apthona hilaris, *Steph.*
Phyllotreta lepidii, *E. H.*
 " *atra*, *Pk.*
 " *undulata*, *Kuts.*
 " *nemorum*, *L.*
 " *sinuata*, *Steph.*
Plectroscelis concinna, *Marsh.*
 " *aridella*, *Pk.*
Thyamis parvula, *Pk.*
 " *holsatica*, *L.*
 " *brunnea*, *Duft.*
 " *lurida*, *Scop.*
 " *atricilla*, *Gyll.*
 " *melanocephalus*, *Gyll.*
 " *pusilla*, *Gyll.*
 " *tabida*, *Pz.*
 " *gracilis*, *Kuts.*
 " *lævis*, *Luft.*
Psylliodes dulcamaræ, *E. H.*
 " *chrysocephala*, *F.*
 " *var. nigricollis*, *Marsh.*
 " *cupronitens*, *Forst.*
 " *attenuata*, *E. H.*
 " *affinis*, *Pk.*
Sphæroderma testacea, *F.*
 " *cardui*, *Gyll.*
Cassida viridis, *L.*
 " *obsoleta*, *Ill.*
Coccinella 7-punctata, *L.*
 " *hieroglyphica*, *L.*
 " *variabilis*, *Ill.*
 " *ocellata*, *L.*
 " *14-guttata*, *L.*
 " *14-punctata*, *L.*
 " *22-punctata*, *L.*
Scymnus Mulsanti, *Wat.*
 " *limbatus*, *Steph.*
Rhizobius litura, *F.*

IRISH HEMIPTERA.

Pentatoma baccarum, <i>L.</i>	Tinicephalus obsoletus, <i>D. & S.</i>
„ viridissima, <i>Pod.</i>	Plagiognathus viridulus, <i>Fall.</i>
Rhacognathus punctatus, <i>L.</i>	„ arbustorum, <i>F.</i>
Picromerus bidens, <i>L. (D.)</i>	Psallus salicellus, <i>Mey.</i>
Tropidocoris rufipes, <i>L. (D.)</i>	„ lepidus, <i>Fieb.</i>
Piestodorus lituratus, <i>F.</i>	Orthocephalus saltator, <i>Hahn.</i>
Drymus sylvaticus, <i>F.</i>	Heterocordylus tibialis, <i>Hn. (D.)</i>
Stygnocoris rusticus, <i>Fall.</i>	Heterotoma merioptera, <i>Scop.</i>
„ sabulosus, <i>Schill.</i>	Rhopalotomus ater, <i>L. (D.)</i>
„ arenarius, <i>Hahn.</i>	Capsus capillaris, <i>F. (D.)</i>
Nysius thymi, <i>Wolff. (D.)</i>	Charagochilus Gyllenhalli, <i>Fal.</i>
Monanthia cardui, <i>L.</i>	Liocoris tripustulatus, <i>Fall. (D.)</i>
Orthostira cervina, <i>Germ.</i>	Orthops Kalmi, <i>L.</i>
„ obscura, <i>Schæff.</i>	„ cervinus, <i>Schæff.</i>
Miris holsatus, <i>F.</i>	„ pastinacæ, <i>Fall.</i>
„ lævigatus, <i>L.</i>	Lygus pabulinus, <i>L.</i>
„ calcaratus, <i>Fall.</i>	„ campestris, <i>L.</i>
„ ruficornis, <i>Fall.</i>	Zygonotus elegantulus, <i>Ban.</i>
Phytocoris dimidiatus, <i>D. & S.</i>	Tetraphleps vittatus, <i>Fieb.</i>
„ floralis, <i>F.</i>	Temnostethus pusillus, <i>Schæff.</i>
„ ulmi, <i>L.</i>	Anthocoris nemorum, <i>L.</i>
Dereocoris bipunctatus, <i>Scop.</i>	„ nemoralis, <i>F.</i>
„ sexguttatus, <i>F. (D.)</i>	Lycocoris campestris, <i>F.</i>
„ binotatus, <i>F.</i>	Salda saltatoria, <i>L.</i>
Litosoma viridinervis, <i>Kirsch.</i>	„ scotica, <i>Curt. (D.)</i>
„ concolor, <i>Kirsch.</i>	Plœaria vagabunda, <i>L.</i>
Aëtorhinus angulatus, <i>Fall.</i>	Nabis apterus, <i>F.</i>
Sphyrops ambulans, <i>Fall.</i>	„ limbatus, <i>Dahlb.</i>
Byrsoptera rufifrons, <i>Fall. (D.)</i>	„ flavomarginatus, <i>Scholtz.</i>
Globiceps flavomaculatus, <i>F.</i>	„ ericetorum, <i>Scholtz.</i>
Campyloneura virgula, <i>Schæff.</i>	Corixa nigrolineata, <i>Fieb.</i>

52, Burton Crescent, November 13, 1877.

ENTOMOLOGICAL RAMBLES, 1877.

By J. B. HODGKINSON.

I PURPOSE briefly to note captures and journeys made to various districts, and will begin with my first visit to Witherslack, about the middle of March, expecting to find *Butalis incongruella*, and a lot of other hibernated species. Although the weather was tolerably fine there was little or no sunshine; and the only insect that ventured to fly was one *Gracilaria phasianipennella*, the only one I saw this season.

My friend Mr. Threlfall was with me, and he only met with one. We were evidently too early for all the *Micropteryx*, so turned to finding *Elachista* larvæ, but with little success. During the whole of the month of April there was little or no sun, so there was an entire void of all the species I had met with in former years. May came in, and now some of the early April species appeared, such as *Lobophora polycommata*, very fine, on May 12th, at Witherslack; the usual time is April 12th. The hibernating *Depressariæ* began to creep out in the middle of May, and two *Capreolella* crept up whilst I was boxing *Elachista subnigrella*; and at Witherslack *Micropteryx salopiella* only began to appear about May 20th, as well as *Incurvaria Zinckenella*. I was afraid that as all the birches that *M. salopiella* was on had been cleared away during the winter I should find none of that species; but there were some little bushes sheltered from the wind, which never ceased to blow; and as I stood beside them patiently, they came popping up as if by magic during the gleams of sunshine, so I netted over thirty specimens. Whilst standing motionless I heard something hissing for some time, but was too intent on *M. salopiella* to pay attention to the cause. At last the reptile, probably tired of my presence, began to crawl off, when I despatched it with my stick. I then went round the bush, and there was another fine viper, which was really a pretty sight: the fore part of the body was raised in a straight line, about two inches off the ground, with its eyes looking at me to see if I was going to pass on; it was motionless to escape detection, and the peculiar position made it look more like a piece of lichen-coloured fir-stick than a snake; however the same fate befel it as the other. The weather was bitterly cold for larva hunting. *Sciaphila Penziana*, *Crambus geniculellus*, and a good many *Satyrus Semele* larvæ turned up among the roots of the grass on the rocks; off the birch came fine larvæ of the butterfly emerald (*Geometra papilionaria*), but they stick hard and fast. On the heath we swept some hundreds of cases of *Coleophora pyrrhulipennella*, not one in a dozen of which, however, may be expected to breed up. *Catoptria aspidiscana*, like other things, was not as common as usual, but it was hard to judge; some odd corners seemed to yield well. All the butterflies, *Nemeobius Lucina*, *Lycæna Argiolus*, *Thanaos Tages*, &c., were very scarce; *Leucophasia Sinapis* I saw laying its eggs, as usual, on the *Lotus corniculatus*, in the woods at Grange. Sticking on the rocks, at Witherslack, we found scores of cases of

Solenobia triquetrella: not a single male came out; nothing but apterous females. On the heaths scarcely a living insect; even the hawking *Diptera*, *Empis borealis*, was either like what it likes to kill—*nil*, or it was not worth turning out to look for food; and the species was fully a month late in appearing. There were no emeralds, and only very few *Geometra* larvæ; *A. strigillaria* was the chief one. May passed away without much being done. I had been to Windermere during the month several times, and there was little or nothing to be seen; the only insects I got on May 28th were *M. salopiella*, *I. Zinckenella*, and one *I. tenuicornella*. This is a new locality for these species; and the place where I took them is in a wood close to Windermere Station. I may note now for June, whilst I am on this locality, that *Micropteryx Mansuetella* was very scarce. The only species tolerably common was *M. Allionella* among the honeysuckle, and *Capua ochraceana* was pretty plentiful; but it was really dejecting to see no life around. Scarcely a wood wren to utter its plaintive and tremulous note. As to beating, a chip-axe (*Eurymene dolobraria*) tumbled down like a dead leaf; and an odd *Cidaria corylata*, and now and then an *Argynnis Euphrosyne* was to be seen; so off I set to look for the field where Allis and I used to take *Coleophora deauratella*. Here another blank: the nice stream that ran through the fields had been drained off, and it was now a potato field; another locality gone. Now into the woods again for larvæ of *Argyresthia Andereggiella*: they, like other things, were a poor crop, and still worse to breed. Two or three more visits yielded little worth note; only *Tinagma resplendella*, *Eupithecia plumbeolata* among the *Melampyrum*, and on the birch I took *Coleophora Wilkinsonella* and *Cryptoblabes bistrigella*, and an odd specimen each of *Phoxopteryx diminutana* and *Stigmonota puncticostana*. I must close June, so far as Windermere is concerned, and go back to another region.

Early in June Mr. Threlfall and I paid a visit to Heysham, below Morecombe, to look for larvæ; but the wind blew a gale, and on the high exposed cliffs we had to lie down to shelter the plants we were examining, and then the cold was miserable. On *Genista tinctoria* we got a lot of larvæ of *Anarsia genistella*: from specimens bred we conclude they are identical with *A. spartiella*; they are darker than *A. spartiella*, which we attribute to the plant being more succulent than the common broom. The *Depressaria*

costosella larvæ on the same plant produced much handsomer moths than those of the common whin or furze. Our next try was to find the larva of *Spilonota amænana* (*incarnatana*) on the *Rosa spinosissima*: we saw our old friend *Dictyopteryx Bergmanniana*, which we recognised, and made out that we had three species of *Tortrix* larvæ; the other two species produced one only of *S. amænana*, and several *S. roborana*. Our elbows being sore with lying on them, and our eyes full of sand, and being starved into the bargain (this in June), in order to stretch ourselves we went among the rocks to birds'-nest: rock pipits and rock doves were there; but this game was soon up, when we saw great patches of *Cochlearia* hanging down in masses, and I told my energetic friend this was the spot where I took some years ago the handsome Irish form of *Plutella annulatella*. He was not long before he was up and throwing the plant down to me; but some of the loose soft freestone giving way gave him a hint to be cautious. We filled our bags and nets, too, with the plant. In the meantime I tumbled one-half of mine away, expecting to find the larva of *Gelechia leucomelanella* to fill its place; but no such luck; it would have been better to leave the plant on the chance of *P. annulatella*. But here is another mystery: I beat over and over again the plants I had thrown out on to a bare rock, and not a larva could be seen, nor yet any traces of the seed being eaten. However, I tumbled the remaining plants on to a newspaper in my breeding-room; and next day there were several fine full-fed larvæ. They changed well on the paper, and I bred over a score. The larvæ must have been buried over head in the seed-pods. This was the only journey to Morecombe.

Now we will pay a visit to Humphrey Head, a bold promontory right opposite, about eleven miles across. During the last week in June, the wind blowing as usual, we kept waiting for fine weather, which never came. We had a resolve always ready that we would go in spite of wind or weather. At last it was dry for a few days, so off we set to look for *Coleophora salinella* on a salt marsh, where I took such a lot some years ago. We had to crawl on our hands and knees, parting the grass to get as many as we did, *viz.* about thirty each: this was two days' work. On the Saturday night we went on the rocks, hoping to take *Barrettii*; but no such luck: we were starved off, and only got *Eupithecia constrictata*, *Ligdia adustata*, *Sericoris littorana*, and such like,—a miserable catch for the misery in store for us. We

thought that a mile might be saved by going over hedge and ditch: the hedges we either got over or through, but the ditches mastered us; they were too wide to jump, and too wet to get near enough to try. After walking through hay-fields and cornfields to get to a bridge we were thoroughly knocked up; and darkness setting in, and not knowing the district, we were heartily glad to see a light and hear a dog bark, and to get into Flookburgh again. The people at the inn had given us up for the night. There was another unpleasant look out: the fields there are half a mile across, and not a few bulls about; their company was certainly not desired by us in the darkness, when we could not see where the hedges were.

Here for the first time on the marshes *Colias Edusa* was to be seen: one female was sitting quietly on a plant of *Lotus corniculatus*, no doubt laying its eggs; now and again it kept walking round, as I have often noticed butterflies, as though wanting to be quite sure it was the right plant to lay on. *Leucophasia Sinapis* (the wood-white) over and over again settles on various plants, but does not attempt to lay on any other but the *Lotus*; it seems to be quite engrossed in its examination. Is it sight or smell that dictates its judgment, if I may so call it?

(To be continued.)

ON THE DEVELOPMENT OF GALLS OF CECIDOMYIA ULMARIÆ.

By E. A. ORMEROD.

THE cecidomyiaceous galls affecting both sides of the leaf of the common meadow sweet (*Spiræa ulmaria*) are well known as they appear on the upper surface, simply as a somewhat spherical or globose enlargement of the leaf tissues, corrugated by a minute network of veins, the colour varying from white to deep pink, and the surface glabrous. Beneath the leaf, however, their structure is very different, being composed, when fully developed, of two filmy growths of tissue, joined or closely applied by their edges, forming together a kind of funnel-shaped or inversely pear-shaped involucre to the true gall or larval chamber within, and the gradual change of form in the progress of development (which, as far as I am aware, has not yet been described) is of some interest.

About the 30th of October, 1877, when these galls were exceedingly plentiful by one of the streams in the neighbourhood of Isleworth, my attention was attracted by the great variety of shape on the part of the gall-growths beneath the leaves, some (apparently still in their earliest stages) being simply like a white blister, or semi-globose protuberance,



EO.

Development of galls showing—1. First stage. 2. Further development, with funnel-shaped extremity. 3. Fully developed gall. 4. The same, in section. 5. Gall spread open after exit of the larva.

beset with white silky hairs (fig. 1); others globose and prolonged to a funnel-shaped extremity (fig. 2); whilst other fully-grown specimens had the funnel-shaped extremity broader and more developed, or open for the exit of the gall-gnat larva.

On carefully examining the gall in its first stage by pressing the side of a fine needle across the convex top, it would be found there was a narrow strap-like process (the future funnel-shaped extremity) folded flatly down on it, in the same way as the tip of a glove can be laid on the contained finger. As growth proceeded this folded extremity altered its position to the complete funnel-shape given at fig. 2, the long blunt point being divided into two parts by a slit on each side, running about a third of the length of the gall and gradually widening, till at the time for the evolution of the larva the outer husk of the gall was merely a globose case, tubular below, of two somewhat leaf-like portions of filmy tissue, closely applied by their edges and guarding the true gall, much as the young filbert is guarded in the long projecting husk, and varying from the portion exposed on the upper side of the leaf in being usually white, and thickly beset with white hairs.

The inner or true gall is similarly globose, and somewhat pointed, usually single-celled, of thin tissue, more succulent towards its base, and white; flocculent outside, but of perfect

smoothness within, and though not always perfectly separated down to the base from its outer husk, yet quite clearly so in some cases, as given in section at fig. 4, which shows the blunt-pointed extremity a little drawn open, as for the exit of the larval tenant.

After exclusion has taken place the gall may be found as at fig. 5, completely expanded, with the two involucreal films thrown back, showing the separation complete to the base, and the sometime bluntly-pointed globose gall lying with its extremities curved inward in the centre of its husk with its cavity displayed, much like some cup-shaped flower in its calyx. The galls vary much in size up to about three-sixteenths of an inch in length, and in breadth in the longest diameter.

At the end of October the *Cecidomyia ulmariae*, Bremi, larvæ were leaving the galls; but except in cases of double formation of the gall itself I never observed more than one tenant in each. The operation of freeing itself was very rapidly performed, in the only case I had the opportunity of watching throughout, by the orange-coloured larva pressing itself tail foremost down the funnel of the gall till it was completely outside, then twisting itself head foremost it curled and struggled for some time on the surface of the gall (the long gall-hairs giving it power to keep hold), the only long-continued position being when it placed itself upright on one extremity, as if boring; and on being transferred to some earth it buried itself.

By the 7th of December, although galls were still to be found on the *Spiræa* leaves, all that were opened were tenantless.

Spring Grove, Isleworth, December 11, 1877.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from vol. x., p. 299.)

77. *Cecidomyia cerris*, Kollar.—The galls of this gall-gnat may often be found in enormous numbers on the leaves of *Quercus cerris*; they generally appear about the middle of June, sometimes still earlier. The gall appears on the upper side of the leaf as a small conical leaf-swelling of about

1 millimetre in height, and with a horizontal diameter of about 2 millimetres at the base; it is bare and green, but later on it becomes yellow or yellowish brown. At the corresponding spot on the under side of the leaf it appears as



Figs. 77 & 78.—Galls of *Cecidomyia cerris*, and in section; Galls of *Cecidomyia circinans*, and a specimen in horizontal section.

a circular, slightly convex, projecting disk, of about 2 millimetres in diameter: it is very thickly covered with yellow or yellowish brown outstanding, fine, but tolerably long, hairs. In the interior is a larva-chamber, in which the reddish orange maggot lies. When the gall contains the gall-gnat larva, and not a parasite, towards the end of October or beginning of November the fully ripe gall swells, so that this disk opens like the lid of a box, and the maggot falls to the ground, where it winters and changes to a pupa, till in May the perfect gall-gnat is evolved. Should the gall contain the larva of an ichneumon the lid does not open; and in order to release itself the fly bites a round hole through the side of the cone on the upper side of the leaf.—G. L. MAYR.

78. *Cecidomyia circinans*, Gir.—This gall may be found on the under side (rarely on the upper side) of the leaf of *Quercus cerris*, often mixed with the preceding species on the same leaf. It occurs as a circular or kidney-shaped disk, which is about 2 millimetres high, with a horizontal diameter of 5 to 6 millimetres, and is thickly covered with outstanding, yellow or gray, hairs. In the centre of the gall, on the upper side of the leaf, it exhibits an annular, mostly yellow, swelling, with an extreme diameter of from 2 to 2.5 millimetres; within this is a thin, hairy membrane, stretched horizontally, which, when the gall becomes mature, opens in the middle and forms a cavity: this leads to the interior at the axis of the gall, and curving spirally becomes formed into a circular channel, which terminates near the periphery of the orbicular

gall, and contains the maggot. This gall appears at the same time as the preceding, yet the maggot passes the winter in the gall, and leaves it as a fly in April: it leaves the annular swelling on the upper side of the leaf in such a manner that half or more of the white pupa-case is left protruding from the ring. Besides these two *cecidomyioides* galls I have found several rarer ones on the leaves of the Turkey oak, which are similar in appearance, and probably are also produced by gall-gnats; but I have not as yet obtained the gall-maker.—G. L. MAYR.

Two other species of *Cecidomyidæ* are known to make galls on *Quercus cerris*. They are both inhabitants of Austria, but the imago is undescribed. The gall of *Cec.?* *subulifex*, Mayr, is mentioned by Giraud (V. z. b. G., 1861), Frauenfeld (1870), Mayr (1874), and F. Löw (1874). That of *Cec.?* *galeata*, Fld., only by Frauenfeld (V. z. b. G., 1861). All four species, being confined to the Turkey oak, are not likely to occur in Britain. At the 4th October, 1876, meeting of the Vienna Society, Dr. Franz Löw read a paper on gall-gnats, in which he described *Cecidomyia homocera*, n. sp., from leaf-galls of *Quercus cerris*. This paper is not yet printed, so I do not know whether it refers to one of the above mentioned or is a fifth species. Remarks on the parasitism, which is curious, may be deferred, as I hope soon to obtain fresh specimens of the galls. Dr. Mayr has obtained two species of *Cynipidæ* and two species of *Torymidæ* from them.—E. A. FITCH.

NOTES ON NEW AND RARE HYMENOPTERA,
CAPTURED DURING THE YEAR 1877.

By FREDERICK SMITH.

THE past season—as far as my own observation has enabled me to ascertain, and from information derived from others—must be pronounced to have been most unfavourable for the collection of the *Aculeata*. According to my experience of such seasons, they are those in which a few great rarities, or the appearance of particular species in very unusual abundance, may be expected to occur; and the past has been no exception to what is apparently a rule. Some years ago I spent the month of August at Deal; during the entire month scarcely a day passed without rain, and the few days that were free from showers were cold and windy.

The day before leaving one of the best localities for collecting *Aculeata* a fine autumnal day occurred, just the day an entomologist longs for. On that day I took twenty-two specimens of *Andrena Hattorfiana*, the finest species of the genus found in this country. This year I visited the same locality, at the same date in August, where on a splendid day not only did I fail to find *A. Hattorfiana*, but I also failed in finding a single specimen of any species of the genus *Andrena*. My favourite bank, at Kingsdown, was, on that occasion, the resort of hundreds of *Colias Edusa*.

In recording what has come to my knowledge of notable captures, I must mention a new species of ant, *Ponera tarda*, discovered by Mr. R. S. Charsley, in a conservatory, at Oxford; he has subsequently described the species. The rare bee, *Prosopis dilatata*, was taken at Hayling Island, by Mr. Edward Saunders. Some very interesting varieties of species of the genus *Sphecodes* have been met with at Guestling, near Hastings, by the Rev. E. N. Bloomfield: a totally black variety of *S. gibbus* (male), and three similar varieties of *S. ephippius* (male). These are the first I have seen of this small bee. Of *S. gibbus* I took four black males on one occasion, at Lowestoft, some years ago; but the black varieties are of very rare occurrence. At the beginning of July I found the very local *Colletes marginata* at Littlehampton; the somewhat local bee, *Megachile maritima*, was plentiful at the same locality, as well as *M. argentata*.

Of the genus *Halictus* Mr. Edward Saunders has taken two or three apparently new species, belonging to the same division as *H. minutus*; also the *H. pauxillus* of Schenck. Mr. Saunders has also taken a fine series of *Andrena nigriceps*, at Southwold, in the month of August. *Andrena spinigera* has been captured at Guestling, near Hastings, by the Rev. E. N. Bloomfield; but the great discovery, made by the same gentleman, of a genus and species new to Britain, is the capture of the season: the bee is *Rophites quinquespinosus*, a species widely distributed on the Continent. I possess examples from the South of France, Nassau, and the Island of Malta. Only a single female was taken at Guestling, and was no doubt mistaken for a species of the genus *Halictus*, to which it undoubtedly bears a strong resemblance; but *Rophites* has an elongate tongue, only two submarginal cells, and has not the anal rima which distinguishes the females of *Halictus*; the male has the

general aspect of a male *Halictus*, but the spines on the apical ventral segment at once distinguishes it.

Mr. J. B. Bridgman, of Norwich, has this season completed his remarkable captures of *Macropis labiata*, by securing at last the long-looked-for female; males he had taken in 1874, and also in 1876; the other sex had not been previously taken in this country. Some forty, or perhaps fifty, years ago Dr. Leach took a male in Devonshire. This remained an unique British specimen in the British Museum collection, until Mr. J. Walton found another in the New Forest, twenty, or probably nearly thirty, years afterwards. Several years again elapsed, when another male was taken by Mr. S. Stevens, at Weybridge. No other capture of the species occurred, until Mr. Bridgman found it at Brundall, thirty-two years subsequently.

I am not aware of any other capture of new or rare *Aculeata* made during the past season; but when such as I have recorded are the fruits of a general scarcity of *Aculeata*, we may be pardoned if we wish many returns of similar seasons.

27, Richmond Crescent, Barnsbury,
December, 1877.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

DESCRIPTION OF THE LARVA OF *ACIDALIA INCANARIA*.—The eggs of this species I received in July, 1875, from Mr. Alfred E. Hudd, of Clifton, Bristol. They were globular, and pale straw-colour. On the 29th of the same month they hatched, and the newly-emerged larvæ were slender, body dark green, the head brown. They fed on *Polygonum aviculare* until autumn, when they hibernated; still feeding a little, however, on withered dandelion leaves, on mild days all winter. The dandelion leaves had been supplied when the knot-grass failed, and was subsequently their food until their full growth. They were spinning up from the middle to towards the end of April. Length about three-quarters of an inch, and of average bulk in proportion. The head has the face flattened, and is notched on the crown. Body tolerably cylindrical, tapering from the 9th segment to the head, which is very small. The segments overlap each other, making the divisions distinct; but there is not the marked difference between the width of the posterior and

anterior of each segment which is characteristic of so many of the species in the genus *Acidalia*. Skin tolerably smooth, but with a tough appearance. The ground colour of the dorsal surface is stone-gray, with very faint pink tinge on the front and posterior segments. Head dirty, smoky brown, with pale stone-coloured streak on each lobe. The medio-dorsal line is pale gray, but very narrow and indistinct; on the 10th to 13th segments it is very broadly edged with smoke-colour; on the other segments this smoke-colour takes the form of a very pretty, but almost indescribable, pattern, having the appearance of a double series of V-shaped marks, or rather a V mark and an X mark, the posterior half of the X, however, being much narrower than the anterior, the V mark being within the anterior of the X mark. There are no other distinct markings, but the sides are much marbled with the dark smoke-colour. The ventral surface seems to have an under-ground of pinkish gray, but is very strongly suffused throughout with pale blue; the sides are thickly dotted and marked with smoky black. Extending the whole length is a series of large pear-shaped marks, one on each segment, and the narrow end of the pear-mark pointing towards the head: these marks are of two colours, a broad central stripe being pale blue, the remainder pinkish, and on the marks is a conspicuous series of black Y-shaped marks; spiracles imperceptible. When at rest the food-plant is grasped by the claspers, and the anterior segments coiled inwards, the head and legs being tucked closely together. The cocoons were formed of a few threads drawn loosely together in the corners of their cage, or amongst withered leaves at the bottom. The pupa is about three-eighths of an inch long, has the thorax rounded, the eyes prominent, and the abdomen tapering sharply to a point. Ground colour dark ochreous-yellow, and the back of each segment neatly marked with four transverse dark brown spots; eye- and wing-cases dull dark green; tip of abdomen very dark brown. A beautiful and strongly-marked series (some almost black) of imagos emerged at the end of June, or in July.—GEO. T. PORRITT; Highroyd House, Huddersfield, December 6, 1877.

LATE APPEARANCE OF *PYRAMEIS CARDUI*.—On the 24th of September last I found a solitary larva of *Pyrameis cardui* feeding on thistle. It fed up slowly, turned to a pupa on the 8th of October, and the butterfly emerged on the 24th of November.—ROSA M. SOTHEY; Sunnyside, Hastings, Sussex.

SPHINX CONVULVULI NEAR LEEDS.—On the 3rd of September a friend brought me a female of this species from Rothwell. It had flown into a brewhouse there.—CHARLES SMETHURST; Leeds, October 23, 1877.

SPHINX CONVULVULI NEAR BRADFORD.—In September last a specimen of *Sphinx convolvuli* was captured by a boy at Heaton, near Bradford. I believe this is the first record from this locality.—J. W. CARTER; Manningham, Bradford, November 16, 1877.

SPHINX LIGUSTRI WITHOUT HIND WINGS.—Last June I bred a specimen of *Sphinx ligustri* with the fore wings quite perfect, but without hind wings, or any trace of their formation.—BERNARD COOPER; Higham Hill, Walthamstow, October 23, 1877.

EUPITHECIA SUBCILIATA, HYPOLEPIA SEQUELLA, AND LITHOCOLLETIS TRIFASCIELLA, BRED.—I had long suspected that the larvæ of the handsome *Hypolepia sequella* fed upon maple, and have now the pleasure of recording the breeding of five specimens from larvæ beaten from that tree in the beginning of June. They are pale green, attenuated at both ends, and possess the remarkable activity characteristic of the larvæ of this group, escaping from the folds of the leaf on the slightest touch. I am now breeding *Lithocolletis trifasciella* from mined leaves of honeysuckle, collected at the end of October. There are two species mining the leaves: *L. trifasciella* and *L. emberizæpennella*, the former twisting the leaf, and the latter causing it to assume a bladder-like appearance. Last year all the *L. trifasciella* I reared emerged in November, the *L. emberizæpennella* remaining in pupa till the following June. I reared fifteen specimens of *Eupithecia subciliata* from larvæ beaten from the flowers of the maple, at the end of May.—W. MACHIN; 22, Argyle Road, Carlton Square, November 28, 1877.

GELECHIA SCRIPTELLA.—From larvæ found feeding between united maple leaves in the early part of September last year, I reared, in June last, about twenty specimens of this pretty species. The larva changes to pupa in a slight silken web in the folds of the leaf, about the end of September.—ID.

OCCURRENCE OF SPILODES PALEALIS AT FYFIELD, ESSEX.—A good specimen of this somewhat local insect flew into a room at Mill Hatch Farm, Fyfield, near Ongar, on the evening of the 12th August, while we were at supper.—ID.

VARIETY OF ANCHOCELIS PISTACINA.—While sugaring near Caterham, on October 6th, I took a fresh specimen of

A. pistacina, which retains the usual markings, but each fore wing is ornamented with a large blotch of a metallic cast near the hind margin, and reaching from the costal to the inner margin. Can anyone account for such a variety; and is it usual?—F. STEWART; New Cross.

CAPTURES NEAR UXBRIDGE.—Among my captures lately have been specimens of the following insects:—*Sphinx convolvuli*, *Nola strigula*, *Liparis dispar*, *Ennomos fuscantaria*, *E. erosaria*, *Selene illustraria*, *Boarmia consortaria*, *Phorodesma bajularia*, *Sterrhia sacraria*, *Apamea fibrosa*, *Xanthia auraga*, *Cirrhædia xerampelina*, &c.

CAPTURES NEAR WINCHESTER.—*Epione advenaria*, *Emmelesia unifasciata*, *Notodonta trepida*, *Apamea ophiogramma*, *Agrotis cinerea*, &c.

CAPTURES NEAR BRIGHTON.—*Sphinx convolvuli*, *Acidalia rusticata*, *Eremobia ochroleuca*, &c.

CAPTURES NEAR EXETER, &c.—*Larentia cæsiata* (on Yes Tor, Dartmoor. Is not this unusual in the South?), *Phibalapteryx polygrammata*, *Tethea retusa*, &c.

I believe these are new localities for *S. sacraria*, *C. xerampelina*, *A. fibrosa*, *A. ophiogramma*, *A. rusticata*, *P. polygrammata*, and *L. cæsiata*.—J. E. BENBOW; Grosvenor House, Hillingdon, near Uxbridge, October 24, 1877.

FEMALE MOTHS ATTRACTING MALES.—Attention having been invited to this subject in a past number of the 'Entomologist,' I venture to record a fact which is new to me, and perhaps to others, that *Sphinx ligustri* possesses this power in no small degree. A crippled female having emerged early last June, I placed her upon the curtain in my bedroom: though the window was open all day no males entered before I went to bed at half-past eleven p.m.; but about three o'clock I was aroused by a loud knocking at the window, which is forty feet from the ground. Leaping out of bed I struck a light, and captured no less than ten males in the room, and could see two others on the glass outside. At this time the female was dead, for I had accidentally crushed her between the bars of the Venetian blind early in the evening. Probably the females of other *Sphingidæ* will prove as attractive during the small hours of the morning. I have also known the female of *Bombyx quercus* after death to attract several males. *Pseudopteryna cytisaria* assembles males from about seven to nine p.m.; indeed I have found that it is a good plan to watch the males as they fly among the furze bushes in order to obtain newly-emerged females;

but as they always seem to be in the centre of a thick furze bush the capture necessitates no small amount of agony. *Amphydasis betularia* and *Chelonia villica* also attract males in the dusk of the evening. I have also several times discovered the females of *Hepialus hectus* and *H. sylvinus* by making a diligent search in spots where the males were hovering.—E. K. ROBINSON; St. Leonard's, Oct. 19, 1877.

MACROPIS LABIATA, *Panz.*—I am indebted to the Rev. J. L. Brown for the first specimen of this insect captured in Norfolk. He industriously collected insects of all orders to make microscopic preparations, and before putting them into spirit very kindly let me look them over and take what I wanted; and it was amongst one of these gatherings I found my first male *Macropis labiata*, taken on the 8th or 10th July, 1874, but where he could not remember, whether at Brundall or Swainsthorpe. I could not find it that year; but next, 1875, I took one male on the creeping thistle at the former locality. In 1876 I took seven more males at the same flower. This present year (1877) I took the first on the 15th of July, and they were to be seen till the middle of August; this year I took the males, not only at the above-mentioned plant, but also at the *Lysimachia*, mint and marsh *Potentilla*. On the 5th of August I took the first British female at the creeping thistle, and on the 14th I took ten more; most of these were more or less imperfect; of these latter two were on the creeping thistle, but not one of these three had any pollen; the others were all at the *Lysimachia*, and had their legs well covered with the pollen, and had evidently drawn their supply from that flower. The insect is a very swift flyer, but not at all active when on the flowers. The locality where they are found is by the side of a boggy marsh, but has much higher ground by the side of it: I am inclined to believe they burrow into a dry-ditch bank. I am greatly indebted to Mr. F. Smith for advice as to where to look for the missing female. Should any hymenopterists have a vacant place in their collection, I have a few duplicates left, which I shall be happy to distribute as far as they will go.—JOHN B. BRIDGMAN; Norwich.

COLEOPTERA-HUNTING IN 1877.—During the past year my *Coleoptera*-hunting has been very successful, although I have not devoted very much time to it. In the early part of June, in beating the blossoms of the hawthorn, I took a specimen of *Orsodacna nigriceps*, about a mile from Oxford, and although I sought diligently I did not see another example. In

November (I forget the exact date) I took, in an old sand martin's nest on the side of Shotover Hill, near Oxford, a single specimen of the curious and very rare little *Leptinus testaceus*, a remarkable locality, I believe, for the insect. Both of these specimens Professor Westwood kindly assisted me to identify. I took also single specimens of *Rhagium bifasciatum* (dead, and much injured) and *Ochina hederæ*, at Bishopstone, near Hereford; *Cilicium laterale*, under a stone, at Aber, and *Cryptolithus riparius* on the top of Moel Union, in North Wales. I found a number of the larvæ, imagos, and one pupa, of *Melanotus castanipes*, in a decaying fir tree, at Bishopstone, in September.—HENRY N. RIDLEY; 46, Holywell, Oxford, December 13, 1877.

MOULD ON INSECTS.—In Greene's invaluable 'Insect Hunter's Companion,' on the subject of mould, I find the following:—"Every insect ought to be touched with a weak solution of bichloride of mercury in alcohol. . . . I believe insects never get mouldy when this is done." But supposing insects, as mine, *have not* been touched, and *have* got mouldy, will this cure them? If not, what will? I should be very much obliged for any information which would help me to get rid of "this, the worst enemy the collector has to deal with."—G. R. DAWSON; Poundsworth, Driffield, December 3, 1877.

[The best preventative known against mould on cabinet specimens of insects is glacial carbolic acid. This may be obtained in small bottles from any chemist. The readiest way of applying it is to place the bottle, having first removed the stopper, in a cup of hot water, which thaws the frozen acid. Then have a little piece of cotton-wool, about the size of a pea, placed on the head of a small pin: this must be soaked in the warm fluid acid. As soon as exposed to the air, in ordinary temperature, the acid on the wool hardens, and then the pin may be stuck in the cabinet drawer: two of these pieces of cotton-wool, so soaked, in each drawer, will deter any further spread of the microscopic fungus, called mould. All specimens already attacked with this fungus may be cleaned with the preparation of alcohol above mentioned. But the greatest preventative of all is to keep the cabinet or store-boxes in a dry room. We may also note that, in answer to an enquiry, Mr. G. R. Crotch gave the following method in the third volume of the 'Entomologist,' p. 72:—"The best way of removing mould from the wings is to dry the insect thoroughly before the fire, and brush it off with a camel's-

hair brush. From the antennæ it can be removed by the above application (one part of carbolic acid to ten of benzine), which might with advantage be applied to the under surface of the body. A slightly stronger solution, brushed over the corners of the drawer and the glass frames, would probably check any further development of mould, as also of mites." The enquirer, Mr. F. Wilkinson, tried this plan, and found it successful.—ED.]

HAGGERSTON ENTOMOLOGICAL SOCIETY.—The Annual Exhibition of this Society was held at their rooms, 10, Brownlow Street, Dalston, on the evenings of Thursday and Friday, 8th and 9th November. The walls were tastefully decorated with preserved fish, birds, &c. The principal exhibitions were as follows:—Mr. C. A. Briggs exhibited a fine variety of *Satyrus Janira*, taken at Folkestone. Mr. Eedle, *Heliothis armigera*, a dark brown variety; *H. peltigera*, very light; *Camptogramma fluviata*, *Anticlea sinuata*, and a case containing preserved larvæ, including *Stauropus fagi*. Mr. Cooke, some fine exotic *Lepidoptera*. Mr. Lane, *Colias Edusa* var. *Helice*, a nicely marked specimen. Mr. Whale, *D. albi-macula*; *Heliothis armigera*, taken at Shirley; *Epunda lutulenta*; and a striking variety of *Mania maura*. Mr. Hockett, *Apamea ophiogramma*, *Apatura Iris*, and *Ennomos erosaria*. Mr. Cooper, *Macaria alternata*, *Cleora glabraria*, and *Lobophora sexalisata*. Mr. Macqueen, a case containing fifty species illustrating the *Lepidoptera* of our London gardens. Mr. Oldham, *Cymatophora ocularis* and *L. albipuncta*. Mr. Pratt, *Xylomiges conspicillaris*, *Cucullia gnaphalii*, *Eupithecia expallidata*, and a variety of *Pyrameis cardui* with the hind wings smoky. Mr. Meek, fine series of *D. albi-macula* and *Meliana flammea*. Mr. Purdey, *Deiopeia pulchella*, and a variety of *Acronycta tridens* with a banded margin. Mr. Bryant, *Noctua ditrapezium*, *Cidaria sagittata*, *Eupithecia togata*, *Macaria alternata*, and *Anticlea sinuata*. Mr. Harper, varieties of *Liparis monacha* and *Limenitis sibylla*. Mr. Elisha, some fine series of various species. There were also a great many specimens of *Colias Edusa* exhibited, some of them varying more or less from the ordinary type. Mr. Trew exhibited a nest of wasps (*Vespa vulgaris*), with hibernating females. There was a very good attendance on both evenings; and the exhibition passed off very successfully.

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VARIETY OF *POLYOMMATUS PHLÆAS*.

By WALTER P. WESTON.



POLYOMMATUS PHLÆAS (VARIETY).

THIS beautiful variety of *Polyommatus Phlæas*, in which the usual spots in the fore wings are replaced by a broad black band extending entirely across the wings, was taken by Mr. A. Marriott, on the 7th of August, 1876, when flying along a piece of waste ground in the neighbourhood of Finchley, Middlesex. The lower wings are marked as usual, and the markings on the under side are entirely normal, without showing the slightest trace of the black band so conspicuous on the upper side. Mr. Marriott informs me that even when on the wing this black band was very perceptible, giving the insect a darker and totally different appearance to the type. My thanks are due to Mr. Marriott for his kindness in allowing me the loan of this insect for the purpose of figuring in the 'Entomologist.'

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in National Museum of Science and Art for Ireland.

No. VI. NYMPHALIDÆ—BRASSOLINÆ.

THE most constant character of the *Brassolinæ* is the presence of a small prediscoidal cell on the hind wings, and the discoidal cell itself is perfectly closed. Nearly all the

species have two large eyes on the under side of the hind wings, one on the middle of the costa and the other near the anal angle. The larvæ have generally bifid tails, and are without spines. This subfamily is exclusively Tropical American, and, along with the *Morphinæ*, includes the largest of the American butterflies. They are robust insects, and generally fly at twilight.

The genus *Brassolis* (which was formerly placed alone in the family *Brassolidæ*, the remaining genera being referred to the *Morphidæ*) may be distinguished by its very small palpi; and the larvæ are destitute of an anal fork. The thorax and abdomen are very robust, and the antennæ are also thick, with a gradually formed club, so that one of the species has actually been mistaken for a *Castnia*. There are very few species known, all closely resembling the three old species, *Astyra*, Godt., *Sophoræ*, Linn., and *Macrosiris*, Westw. and Hew. The two first are about three inches and a half across, dark brown, with a broad tawny band on the fore wings, bifurcated on the cell, and running from thence to the inner margin. In *B. Astyra* the costa is much more strongly arched than in the other species; and the hind margin is slightly concave. *B. Sophoræ* has a narrower and redder submarginal band on the hind wings also. *B. Macrosiris* is a very heavy-looking, purplish brown insect, with two large round black spots surmounted by a smaller white one near the tip of the fore wings; and the apex of the hind wings, and a short line running from the costa of the hind wings just beyond the cell, are violet.

The genus *Opsiphanes* includes a number of species, much resembling *Brassolis*, but with broader wings and more slender bodies. They are nearly all brown insects, with a band, varying from buff to reddish orange, running from the middle of the costa of the fore wings, where it is often bifurcated, to the hinder angle, and generally a similar submarginal band on the hind wings. In *O. Syme*, Hübn., the band is submarginal on the fore wings also, and there is a shorter one within it; the hind wings of this species are suffused with blue in the male. In *O. Batea*, Hübn., all the wings are tawny to beyond the middle; and *O. Boisduvalii*, Westw. and Hew., is uniform tawny, with a dull brown spot near the tip of the fore wings. *Dynastor Napoleon*, Westw. and Hew., is an immense brown butterfly, with narrower fore wings and thicker body than *Opsiphanes*; it expands about seven inches. There is an interrupted pale yellow band

across the fore wings, and the hind wings are broadly edged with orange; there are also a few orange spots near the tip of the fore wings. This is one of the handsomest and rarest of the Brazilian species. The other known *Dynastor*, *D. Darius*, Fabr., is a much smaller insect, about three inches and a half across the brown fore wings, with dull white spots on the outer half of the fore wings, and a white spot on the costa of the hind wings, from which a dull bluish stripe runs curving half-way to the anal angle.

Penetes Pamphanis, Westw. and Hew., is another fine and rare Brazilian species, with rather long fore wings, concave on the hind margin, and finely spotted with crimson; the hind wings are brown; the under surface is without eyes, being coloured nearly as above.

The genus *Caligo* contains some of the largest of the American butterflies, which may be recognised at once by the huge black eye on the middle of the hind wings beneath, containing a crescent of bluish white scales, and enclosed in a broad yellowish ring; the upper side is velvety black, generally suffused with blue towards the base of at least the hind wings; the fore wings are often buff or dull yellow towards the base, or the bluish portion is bordered with a streak of this colour. In *C. Atreus*, Koll., the fore wings are marked with a brilliant purple band, divided by a pale streak running up from the costa, and diminishing upwards; the hind wings are broadly bordered with orange, edged with black on the upper half. *C. Beltrao*, Ill., has the tip and hind margin of the fore wings bordered with orange, with an irregular black mark just before the tip. The species of *Caligo* measure from about five to seven inches across; those of *Eryphanis*, Boisd., are a little smaller, and the eye of the hind wings is much smaller, more oval, and generally connected with another small spot. The males are rich purple, bordered with black, and have an oval patch of yellow raised scales on the inner margin of the hind wings. The females are brown, sometimes dull blue towards the base, and generally with a yellow or orange band towards the hind margin of the fore wings; also visible in the male of *E. Æsacus*, H.-S.

Narope is a curious little genus, brown or dull fulvous, with pointed fore wings and angulated hind wings, much resembling the genus *Anæa* (*Nymphalinae*) both in size and appearance; there is a tuft of hairs on the under side of the fore wings, and a large predorsoidal cell on the hind wings,

characters at once sufficient to separate it from the *Nymphalinae*. The species measure about two inches across, and are without eyes on the under side.

The species of *Dasyophthalma*, the last genus of the *Brassolinae*, are about three or four inches across. The male of *D. Rusina* is brown, with a yellowish band, angulated at the costa, crossing the fore wings near the margins, and a corresponding white band across the middle of the hind wings; there is a brilliant blue patch on the inner margin of the fore wings at the base, and within the white band on the hind wings; the pale bands are whitish beneath, and that on the fore wings bifurcated; above the branch is a very small eye, and there are two larger, orange, black and white eyes on the costa and the middle of the hind wings within the band; the whole under surface is striated with black and gray. *D. Creusa*, Hübn., is velvety black, tinged with green, especially on the hind wings, banded with pale yellow on the fore wings (the stripe broadest at the inner margin), and spotted with yellow on the costa of the hind wings, or with some greenish spots running half across the wing from the front angle; the under side of the hind wings is striated with brown and dull green, with three eyes arranged triangularly; there are also two small eyes near the tip of the fore wings beneath.

ENTOMOLOGICAL RAMBLES, 1877.

By J. B. HODGKINSON.

(Continued from p. 12.)

EARLY in June I went with our Scientific Society on an excursion to White Well, about twenty miles from here, on the borders of Yorkshire. I had an idea that *Talæporia pubicornella* might occur there, as well as at Grassington; but I was quite disappointed, both with the vegetation and the district generally. It was all that could be desired for hill and dale, rivers and woods, but not of a character for an entomologist: the broad acres were eaten bare by sheep, and the woods tenanted with game; one could not look over a stone wall, or be looking diligently for larvæ, even on the road-side, but a gamekeeper put you under his supervision. I had only a couple of hours, under a blazing sun, and a limited permission to ramble over a small place of my own selection, where the keeper did not want me to go; still he

was a better sort of a fellow; and his master and I being good friends I made the most of it, and took a fine series of *Ephippiphora Pflugiana* (*scutulana*), a lot of *Depressaria hypericella* (the first time I ever met with it), several *Gelechia acuminatella*, *Eupæcilia maculosana*, *Lampronia rubiella*, &c., and one fine *Cidaria silaceata*. The walls in this district are built entirely of stones, full of fossils.

During the first week in June, the weather bitterly cold, Mr. Threlfall and I could find no moths at Witherslack worth looking after, so we went to Whitbarrow. About three miles from the inn we first turned into a large larch plantation, and found some larvæ of *Spilonota lariciana* and *Pædisca occultana*. Then on the way, amongst the stems of *Eupatorium cannabinum*, we found the larva and pupa of *Pterophorus microdactylus*, and the twisted ox-eyes yielded larvæ of *Dicrorampha consortana*. At the base of the rocks, on the wild marjoram, were the larvæ of *Coleophora albitarsella*; from the stunted blackthorn we tried hard to dislodge the larvæ of *Rhodophæa marmorella*, by no means an easy job: you must make up your mind that your umbrella will have to be carried home all to tatters and limbs broken, or thrown away as not worth mending. We did not get over a score in two or three hours, until I met with a whitethorn tree under the crags, with a lot of sheep's-wool on it. As soon as I could get my remnant of an umbrella to open, as a last try, for the wind was blowing a gale, I gave a bough a sudden knock, and then stood in amazement. I counted up to fifty, and still there were more to count. I tried again, after partly picking the last lot, and got quite a hundred off this one bush. Close by was a buckthorn tree; I put some branches in a bag, and bred quite two hundred *Laverna rhamniella* from them. Next I turned to *Ephippiphora signatana* larvæ, on the sloe, but found them very scarce, only breeding about a dozen specimens, and a few *Hemithea thymiaria*, and a small dark *Coleophora*, off the same leaves. On the *Lychnis dioica* we found a lot of larvæ of *Gelechia viscariella*. As to nothing we were glad to stay in; at least I would not stir; but my friend turned out with his lamp, anxious to get *Depressaria pallorella*, but in vain; he always brought in a good supply of *Depressaria arenella* and *D. applanella*. Even the larvæ of *Eupithecia sobrinata* were scarce, and only one *Thera simulata*; and of *Argyresthia arceuthinella*, only odd ones were out; so this out was made the best of.

Waiting for a change of weather, on the 8th of June we set off again, the weather rather better: a little more sun; still no quantity of any moths on the bank opposite the inn, which is, or has been, an entomologist's paradise. During a gleam of sunshine a moth came and dropped on a stone beside me, and behold it was *Miana expolita* (*captiuncula*); then another, and another. I thought I was in luck: however, during the three hours waiting, only three more came steering against the wind; and the strangest part of the affair was that the 9th of July used to be my set day for them, three miles from this place: and this in spite of such a cold season. In the evening *Eupithecia constrictata* was out, but very sparingly. This species was out, as well as *Hyria auroraria*; and was quite three weeks earlier than former years: the pupa must have been under the sun's influence more particularly this season. I went on to the moss-side to look for *Melanippe hastata*, but saw none; and have only seen one for a dozen years. I well remember Mr. C. S. Gregson and myself each taking about three dozen of this and *Leucophasia sinapis*; and why the latter has disappeared I know not. Some twenty-five years since I used to see them by five o'clock in the morning, flying softly along whilst I was dressing, just opposite my bedroom window. *Butalis fuscoæneella*, *Ennychia octomaculalis*, and, in the chinks of the rocks, *Psychoides verhuellella*, were to be found; the very common *Coccyx vacciniana* was only to be found by odd ones; I have known when a score could be taken in one sweep. We took a lot of larvæ of *Elachista adscitella* in the stems of grass (*Sesleria cærulea*), from which I bred over one hundred specimens. In the month of June a good many useful species turned up during several visits; a good many *Penthina prælongana*, *Phoxopteryx siculana*, *P. biarcuana*, *Lampronia luzella*, *Bucculatrix frangulella*, *Coleophora Wilkinsonella*, *Phoxopteryx uncana*, *Eupæcilia nana*; for first time among the birch many good *Nepticulæ*, and some larvæ of *Pterophorus tephrodactylus*, quite a month later than usual. I had the mortification to see a lot of young larvæ of *Endrosis fenestrella* feeding upon my pupæ, and being only in time to save one. In Grange Woods there was little indeed to catch, *Grapholita obtusana* being very scarce; the only common *Tortrix* was *Ephippiphora cirsiana*, among the knapweed; two specimens of *Diplodoma marginepunctella* were flying softly under a shady nut-bush; and *Tinea semifulvella* on tree trunks, and flying in shady places along

with *T. ganomella*. By sweeping *Elachista apicipunctella*, *E. humiliella*, *E. tæniatella*, *E. zonariella*, *E. subochreella*, and *E. Gleichenella*, turned up. In vain I swept and looked from morn till eve for *Coleophora fuscocuprella*, only taking one; I saw it walking on a nut-leaf. The same spot yielded me over fifty larvæ last September, from which I did not breed a single specimen. From among the *Helianthemum* I swept some fine *Butalis fuscocuprella* and *Laverna miscella*; the tops of the *Hypericum* were twisted in all directions with *Depressaria hypericella* larvæ.

The next excursion was early in June to the banks of the Wyre, near Fleetwood, to look for larvæ of *Gelechia instabilella* in the roots of *Plantago maritima*, and *G. ocellatella* in the leaves of *Aster tripolium*. By the way, I was greatly misled for years how to find *G. instabilella* larvæ: I have looked over acres of plantain leaves to no purpose, until one day I was looking earnestly at a lot of dead, yellowish brown roots, and it just struck me how the sea-pink looked when *Sericoris littorana* had been there. I at once broke off a dead root, and there was the fine yellow larva, with a black head, of *Gelechia instabilella*. I bred a nice series from this find. I may here note that I bred several specimens of *Ditula semifasciana*, from larvæ feeding on the wild carrot. I got them along with *Depressaria Douglasella*.

My next paper will be on July captures.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen.

By EDWARD A. FITCH.

(Continued from p. 16.)

79. *Andricus æstivalis*, Gir.—This gall may be found in great numbers, a short time after the blossom, on the thickened and shortened catkins of *Quercus cerris*. It occurs in such a manner that the galls being distributed, like the flowers, they together very much resemble a mulberry. Its shape is almost oviform, being 2 to 4 centimetres long by 1·5 to 3·5 broad. The single, greenish yellow or red galls are more or less pressed into one another, especially at the base, but are quite free at the apex. When mature each gall is cup-shaped, thin at the base, and expanding gradually to

the ragged rim. It is about 1 centimetre high, and has at the top of the rim of the cup a diameter of 6 to 8 millimetres. The under woody half of the upper empty cup is filled up, and contains some larva-cells. Dr. Giraud says, in his 'Signalements,' that he only found one larva-cell; but the smallest mature gall now before me contains more. Below this chamber a conical swelling rises in the cavity of the gall, at the bottom of the cup. When the gall is not fully matured only half of the cup shows, as you could imagine a vertical



Figs. 79 & 80.—Galls of *A. aestivalis* (to the right, at foot, an imperfectly-developed gall; and to the left, above, a specimen in vertical section). Galls of *A. grossulariae* (and in section).

section of it: this bears a great resemblance to a scale of a fir-cone; at the bottom of this the germ of the larva-cell is to be found. The gall-fly appears at the end of June and in July.—G. L. MAYR.

We now come to the catkin-galls. If we reckon the catkin specimens of *S. baccarum*, which has already been described amongst the leaf-galls (Entom. x. 206), there are ten species known to gall the oak flowers: two of these, this and the one next described, are confined to the Turkey oak. Hence it is not likely this gall occurs in Britain, although Mr. Cameron took an *Andricus*, near Loch Lomond, on May

20th, which he says must be either *A. æstivalis* or a new species. Dr. Giraud examined two hundred specimens of this species, and only found four males. He also bred *Aulax pumilus* from these galls. Dr. Mayr gives *Callimome regius* as a parasite.—E. A. FITCH.

80. *Andricus grossulariæ*, Gir.—This currant-gall, which also occurs on the Turkey oak at the end of May, gives the tree a strange appearance, covered with its great masses. Although not generally common, thousands may sometimes be found on a single tree. From their beautiful red colour, and from their accumulation on a catkin of the oak, it looks from a distance as if the tree were covered with currants. The single gall is inverted pear-shaped, with the thick end towards the flower-stalk, whilst its conical end forms the apex. It is 6 to 7 millimetres long and 5 to 7 thick. It is green at first; this soon becomes red, and finally, when mature, it is reddish brown. Its surface is moderately glossy, sometimes slightly wrinkled, and covered with very scattered and very short simple hairs, such as grow on the flower-stalks and on the leaves of the Turkey oak. It is thickly covered with hairs at the apex. In section it exhibits a soft parenchyma. Near the base of the gall there is a yellow, moderately hard, oviform, perpendicularly placed inner gall; above this there is a moderately wide channel, which extends to the top of the gall. The perianth and anthers are situated at the base of the gall; but anthers may often be found springing from the gall itself, so that the gall may be considered as developed from the base of the flower. When it happens that there is only one gall on a flower-stalk, we generally find the ordinary shortened catkin covered with five to ten galls at its thick base, densely packed on one another. At the latter end of June the gall-fly bores through the upper end of the inner gall, forces itself through the channel, and, in order to free itself, bites a hole at the apex of the gall. Galls, from which the fly has emerged, may sometimes be found on the trees in autumn.—G. L. MAYR.

This gall, like the preceding, is only to be found on the male flowers of the Turkey oak. *Synergus variabilis*, Mayr, is an inquiline; and *Megastigmus dorsalis*, Fabr., a parasite in it. Both appear a little later than the gall-maker. Dr. Giraud also mentions the presence of cecidomyioides larvæ in the “cavité supérieure.”—E. A. FITCH.

ICHNEUMONS;

WITH DESCRIPTIONS OF THE PREVIOUSLY UNKNOWN SEXES OF
TWO SPECIES.

By JOHN B. BRIDGMAN.

WITH what intense disgust are these lively and elegant insects generally looked upon by lepidopterists. How many look back with regret on the fine, rare moths they might have bred but for those "nasty" ichneumons, which, in most cases, are unfortunately immediately destroyed—a practice that is deeply to be regretted. If lepidopterists could be induced to save such ichneumons as they breed, and make a note of the species from which they were bred, a large amount of useful knowledge would be gained that is now quite thrown away, for no one has the same opportunity of making such valuable notes as the breeder of butterflies and moths.

I think it is a great pity that more of our working entomologists do not take to some of the less beaten paths of Entomology than *Lepidoptera* and *Coleoptera*; none are less devoid of interest, and many are more replete with it. Take, for example, the insects named at the head of this paper, and think for a moment of the important part they play in maintaining the balance of Nature; think of the enormous quantities of larvæ that are annually destroyed by ichneumons, which thus become valuable helps in keeping their numbers within bounds. It is not only the larvæ of *Lepidoptera* that are attacked, but those of sawflies, gallflies, flies, and beetles, are also destroyed. We cannot but admire the variety of forms that are met with. The majority are exceedingly graceful: their slender antennæ, which seem ever on the move; the colours of their bodies and legs are very pleasing,—black, red, yellow, and white, in almost every possible arrangement. The aculeus, or ovipositor, also varies exceedingly in length, size, and direction; in some it is considerably longer than the whole body, as in *Rhyssa*, *Glypta*, &c.; and this is very necessary for these insects, which deposit their eggs in wood-boring larvæ, such as the great sawfly (*Sirex*). From this elongated ovipositor every variation in length is to be found; some, indeed, have it not protruded at all: this is the case in many of the genus *Ichneumon* and *Tryphon*. Others have it quite straight, as in the genus *Cryptus*, those elegant Ichneumons which have the first segment of the abdomen petiolated,

and the middle submarginal cell of the fore wing five-angled. In others the aculeus is curved upwards more or less, especially so in the *Ophionides* species, which have the abdomen more or less compressed; in some it curves so very much that one wonders how the insect could put it to its proper use, *viz.* to perforate the skin of the larvæ in order to deposit the egg or eggs. Ovipositors are sometimes very slim, and appear quite inadequate for the function they have to perform. Such is not indeed the case, as I have found out by that best of all tests—practical experience. I once caught a large, red and black *Cryptus*, with an aculeus as long as its abdomen, and was holding it in my fingers, when to my surprise it turned the sting downwards at right angles to its body, and then with a jerk of its body caused this little bristle-like appendage to give me as sharp a sting as if it had been done by a wasp.

There is one genus concerning which information is much wanted; that is the apterous little *Cryptides*, of the genus *Pezomachus*, which greatly resemble small ants, but the antennæ point out the difference at a glance: some of these have been bred from spiders' nests. I bred *P. zonatus* from a nest, which I found last spring, attached to the upper part of a blade of grass: it looked like a small dab of mud on the end of the blade. The larva of this *Pezomachus* did not require all the eggs the nest contained for its sustenance, and consequently many little spiders were afterwards hatched. Of this genus there are about fifty species recorded as British; eight only are males, the rest being females. Few of these species have the sexes associated, without doubt. Lepidopterists might greatly assist in determining the sexes. I once found the cocoon of the whitethorn sawfly (*Trichiosoma lucorum*) with the end cut off in the usual way by the fly, clearly showing that a sawfly had emerged from it, but at the bottom were four cocoons containing living larvæ; two of these I killed accidentally, but the other two produced ichneumons, *Cryptus migrator*. Of course I cannot be certain that the eggs were laid in the larva of the sawfly, and on becoming full-fed had issued from the larva, and formed their cocoons inside of the cocoon of the sawfly, having left sufficient life in the sawfly larva to enable it to go through its transformations and to emerge a perfect insect; still such is the inference. Some ichneumons deposit only a single egg in a larva, whilst others insert a quantity; size probably dictates the number to the ichneumon that she may

deposit. The larvæ of these parasites do not always pass through all their stages without let or hindrance, for just as they make the first attack they in like manner are attacked by other ichneumons,—the parasite of the cabbage butterfly, whose cocoons look like a cluster of small yellowish comfits, and are to be found about palings or nooks of gardens, is subject to such attacks from several other *Ichneumonidæ*: this year (1877) I bred two species of *Hemiteles* and one of *Mesochorus* from these cocoons. We cannot but admire the instinct, as it is sometimes called, which enables the ichneumon to detect such larvæ as have not already been attacked by parasites, and to teach it the proper depth to deposit the eggs; not to pierce so deep as to kill it, still deep enough to prevent the egg being got rid of when shedding the skin. Before concluding I would mention the opposite sexes of two ichneumons I have taken, which I have not yet seen described.

Exetastes calobatus, Gr., male, differs only from the female in having three marks on the face; scutellum and the front coxæ yellow; the intermediate coxæ and all the trochanters red, the posterior one slightly tinged with black at the articulations. *Phytodietus scabriculus*, Gr., female, differs only from the male in being a little larger, and in having a narrow white ring in two joints of the antennæ, about one-third from the apex.

In concluding this rambling paper I would say to lepidopterists and others, who may breed these insects and would save them, that they should always be killed with sulphur; then if they are left for a day or two in a damp box the legs and wings can be very easily displayed, although they may not be regularly set. The larger ones are best mounted half-way up rather long pins, with the wings anywhere rather than over the back. It is better to gum the smaller ones on paper or card, with a mixture of gums tragacanth and arabic; the legs, wings and antennæ should be stretched out, at least on one side; and as the mouth and antennæ beneath are important characteristic points, a small hole should be made in the card, about one-sixteenth of an inch in diameter, and the insect mounted with its mouth over the hole: this will allow of these organs being easily examined.

Norwich, December 30, 1877.

COLLECTED OBSERVATIONS ON BRITISH SAWFLIES.

By the late EDWARD NEWMAN.

(Continued from vol. ix. p. 67.)

THERE are, then, two very distinct kinds of resemblance, which I would call endomæous and extomæous. The first relates to internal and intrinsic characters; frequently, but not necessarily, also to habits, economy, and food. The second only to external or superficial characters; those characters which are the first to strike the eye and the mind of him who applies eye and mind to the subject. I will give an instance of this in each of the three great tetrarchies of *Endosteates*.

In sucklers the resemblance between the flying phalanger (*Petaurus*) and the kangaroo (*Macropus*) is endomæous, but between the flying phalanger (*Phalangista*) and flying squirrel (*Pteromys*) it is extomæous. I omit to mention the birds because the natural distribution of that class has not received the searching investigation of science. In reptiles the resemblance between the newt (*Triton*) and the frog (*Rana*) is endomæous; that between the newt and the lizard (*Lacerta*), extomæous; although the similarity of form is so exact that Linnæus placed them in the same genus, calling them *Lacerta agilis* and *L. palustris*; and as regards our British reptiles he made them consecutive. In fishes the resemblance between the eel (*Anguilla*) and the muræna (*Muræna*) is endomæous; indeed so nearly are they alike in structure that ichthyologists place them in the same family. On the other hand, the resemblance between the muræna and the lamprey (*Petromyzon*) is entirely extomæous; it is external, although so close as to deceive all but the educated eye of science. This external, or extomæous, resemblance has long been familiar to naturalists, and has been utilised with the view of substantiating a host of hypotheses, in some of which it is called protective: it is the relation of affinity and analogy so eloquently advocated by Mr. W. Macleay.

Another observation seems absolutely necessary, that is to caution the inexperienced reader against supposing that the boundaries of groups are rigidly defined in Nature. Two centuries ago the immortal Ray told us this was not the case. He says:—"As Nature never passes from one extreme to another, except by something lying between the two, so she is accustomed to produce creatures of an intermediate and doubtful character which partake of both extremes, and so

completely connect them as to render it altogether uncertain to which they more truly belong.”—*Ray; Preface to ‘Historia Plantarum.’*

Ideas to the same effect were subsequently avowed by Linnæus, Lindley, and a host of others, and have never been controverted; neither is it possible to controvert such a self-evident truth. Then, also, with regard to exceptions, these do and must occur without interfering with the general utility of a scheme. Some have said that the *exception* establishes the rule; but without going to the full extent of this apparent paradox, I entirely concur with its spirit, since I know that an insect may be legless, wingless, antennæless, without interfering in any manner with the propriety, or even the necessity, of arranging it according to the structure of these organs, or of neglecting or undervaluing the teaching of that structure or that economy which is most emphatically pronounced and most prominently displayed.

Too much stress can hardly be laid on the fact that *every character* must be consulted in the course of sub-division, or, what Cuvier calls, the “distribution” of the Animal Kingdom, not necessarily all at once, or all at every stage of the process of “distribution,” but every character will occasionally crop up more prominently than the rest, and must then be utilised. In the foregoing remarks, structure and the arrangement of bones were thus utilised in my *first* division; number of legs in my *second*; metamorphosis will be employed in my *third*; combined with varied form and character of the mouth and food and economy in the *fourth*. It must not be inferred that no other differences than those mentioned exist in either case, but that these are the most salient, and appear most distinctive in those cases in which they are employed.

There can be no doubt that a “system of Nature” exists, but that the key to this system is not placed in our hands. The distinctive characters are Nature’s, but the mode of employing them is man’s, and man is very apt to go astray while attempting to discover and define the principles on which she works. It has, however, been shown by Cuvier that the animal kingdom is divided into four provinces, and Latreille in his last great work, the ‘*Causes d’Entomologie*,’ having shown that one of these provinces, *Exosteates*, is again a tetrarchy, the same will be adopted here without hesitation and without alteration.

(To be continued.)

REVIEWS.

Aeltere und neue Beobachtungen über Phytopto-Cecidien.
By Dr. F. A. W. THOMAS. Halle-on-Saale. 1877.

THIS short pamphlet, of 'Former and Recent Observations on Phytoptus Galls,' gives in its fifty-nine pages much information of value. It is reprinted from the 'Zeitschrift Gesam. Naturw.' (vol. xlix., 1877), and is accompanied by one plate. It comprises a chronological sketch of the literature of the subject from the first recorded observations to the end of 1870; also some notes on gall structure, and on Beyerinck's classification of the mite galls. These are followed by descriptions of new or little known *Phytoptus* galls, in continuation of the author's previous publications in the 'Nova Acta' of the Leopold-Charles Academy.

The first recorded observations of mite-galls appear, according to Hardy, to have been those of the brothers Bauhin, on the silky-haired growths of *Thymus serpyllum*. The subject is then traced onwards,—through Malpighi's observations on the vine *Erineum*, Tournefort's conjecture in 1698 as to the cause of the diseased growth lying in insect puncture, Réaumur's descriptions of the leaf-galls of the lime and sycamore (still without any knowledge of the tenants and immediate cause), and Vallot's numerous discoveries and observations,—to the period when, through Turpin's examination, the formation of these galls was found to be attributable to mite agency.

The history of the gradual dawn of certain light on the subject is much the history of the experience of each original observer of modern days. There is in either case the attention attracted by the diseased growth (the "felts" of the early botanists), the gradual discovery of the *Acarid* presence, and the long investigation requisite for proof as to which of the various tenants is the fundamental cause of the diseased structure. This history is necessarily full of references (which are fully given by Dr. Thomas) to the publications of continental and American observers, as well as of our own country.

Descriptions and notes on structure of previously unknown or little known galls occupy about half the pamphlet; these in many cases occurring on species commonly found with us, *e.g.* of *Veronica*, *Stellaria*, *Cerastium*, &c., so as to make the observations with the previously published notes available as

a kind of manual for our own as well as continental observers. The index refers to seventy-eight distinct plant-genera; and altogether the pamphlet is of interest for perusal, as well as of value for reference.—E. A. O.

Sketches of Animal Life and Habits. By Dr. ANDREW WILSON. W. & R. Chambers: London and Edinburgh. 1877.

WE have before had occasion to notice works by Professor Andrew Wilson, who as a popular writer on Natural-History subjects has in this work excelled himself. This is saying much, when we know what he has already done towards creating a taste for the study of the most fascinating and beautiful of all the sciences. His style is such that many people on reading his books and scattered papers cannot fail to take a deeper interest in the, to them, hitherto despised atoms of life, which they have been passing as animated nothings. In these 'Sketches of Animal Life and Habits' Professor Wilson, in his usual pleasant and popular manner, leads us step by step from the lowest forms of life, as shown in the animalcules, which we may find in the water we daily drink, or which created such wonder when dredged from the deep sea by the members of the recent 'Challenger' Expedition, on by degrees to the higher reptiles; at which stage we leave "these cold-blooded creatures" for the higher animals. Though thus only noticing the lower half of animated Nature, he finds in it a text of such interest that his readers cannot fail to follow him to the end.

After treating of the lowest animals the author gives us some most readable chapters on "Sea Flowers," "Sea Eggs," "Sea Butterflies," &c.; coming to what will most interest the readers of this magazine in his chapters entitled, "Some Curiosities of Insect Life," and "Animal Disguises and Transformations." In these both the young and elder entomologist will find much to both instruct and interest him.

In recommending this little book to our readers, we would remind them that in pursuing their favourite branch of Natural History it is always well to try to understand the relation of each group of animals to its neighbours, thereby learning where one group ends and another begins, or where in the scale of Nature any particular group should be placed, and why it should be so placed. In this book Dr. Wilson gives many hints and suggestions, which will certainly lead many

to extend their studies who were hitherto mere collectors of cabinet specimens. This work is the more interesting on account of its beautiful and numerous illustrations.—ED.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

THECLA PRUNI REPORTED IN HAMPSHIRE.—I observe in Mr. E. K. Robinson's interesting note on *Lepidoptera* near Petersfield, Hants, the mention of the capture of *Thecla Pruni* in that district. So far as I am aware the occurrence of this very local butterfly has not hitherto been recorded in Hampshire (its extreme range southward being apparently North Bucks); and speaking from my own knowledge of its habitats in the Midlands I do not think its presence in that county is to be looked for. Perhaps Mr. Robinson will kindly confirm or correct his note of its capture.—HAROLD CONQUEST; West Lodge, St. Ann's Road, Stamford Hill, N., December 13, 1877.

[Mr. Robinson thinks this an error of transcription when copying his list of captures. *Thecla Betulæ* was the species intended.—ED.]

ACRONYCTA MYRICÆ NOT A DISTINCT SPECIES.—The following extract from a letter received from Dr. Staudinger will be interesting to British lepidopterologists:—"Thank you kindly for the two specimens of *Acronycta myricæ*, Gn. I received before specimens of this species from England, and saw many there, and I find that they are quite identical with the alpine form of *A. euphorbiæ*, named *montivaga*, also by Guenée."—F. BUCHANAN WHITE.

CARPOCAPSA POMONANA AND **HEUSIMENE FIMBRIANA**.—Having put some larvæ of *Carpocapsa pomonana* in a large phial, I found on examination that two of them had entered the cork to become pupæ. Might they not likewise enter the bark of the apple trees in the same way? I was surprised last spring to find that I had bred four *Heusimene fimbriana* from a piece of worm-eaten oak bough, brought from Hendon, in February.—H. SHARP; 16, Huntsworth Terrace, Portman Market, London, January 14, 1878.

TINEINA REARED IN 1877.—*Harpigteryx scabrella*.—I bred a fine series of this from larvæ beaten from hawthorn, at Loughton, in the middle of June. *Antispila Treitschkiella*.—I am indebted to the kindness of Mr. Sydney Webb

for the first supply of larvæ of this beautiful insect, and, profiting by it, I went at the end of September to a hedge in Kent, composed principally of dogwood, and collected a large number, which were then nearly full-fed. The mined leaves were placed on fine earth in a flower-pot, and covered with a glass cylinder: as the larvæ cut out their cases the leaves were removed. The pot was kept exposed to the full influence of the weather, till the emergence of the moths in July, when I reared a large number.—WILLIAM MACHIN; 22, Argyle Road, Carlton Square, E., January 24, 1878.

THE BRITISH HEMIPTERA-HOMOPTERA.—While agreeing generally with what Dr. Power has said (Entom. xi. 2), I yet take exception to his deterrent remark, that of the British *Homoptera* "we have scarcely even a satisfactory catalogue, much less description, of those which are known." All the species of *Cicadaria* and *Psyllina* known up to 1876 to inhabit Britain are included in the synonymic 'Catalogue of British Hemiptera,' published by the Entomological Society of London in that year; and, except the oldest and well-known species, all have been described in the 'Entomologist's Monthly Magazine' and the 'Transactions of the Entomological Society.' With respect to the *Aphidina*, Mr. Buckton's 'Monograph of the British Aphides,' published by the Ray Society in 1876, is a good contribution to our knowledge; and when this is completed all that will be wanting will be a proper list and descriptions of the few British *Coccina* and *Pediculina*. There exist, therefore, abundant guides for those who are disposed to leave the beaten track, and work in a field that offers rich inducements to investigators.—J. W. DOUGLAS; 8, Beaufort Gardens, Lewisham, January 5, 1878.

BLOTCHED HOLLY-LEAVES.—I in no way exaggerate if I say that quite fifty per cent. of the holly-leaves that came under my notice last year were blotched by *Phytomyza obscurella*, Fallen. I noticed this in many localities, both in Essex and Middlesex. When these affected leaves were used in church or room decorations they soon had a very scorched and withered appearance. This year I have scarcely seen a single holly-leaf tenanted by the *Phytomyza*. The meteorological conditions were probably unfavourable for the oviposition of the little dipteran, although they were so favourable for the flowering and fruiting of its food-plant. The fly emerges in May and June, a little later than the

holly blooms. *P. obscurella*, like most of its leaf-mining congeners, is preyed upon by two parasites, a *Braconid* and a *Chalcid*, unless the latter be a parasite of the second degree.—EDWARD A. FITCH; Maldon, Essex, December 28, 1877.

OBITUARY.

MR. THOMAS VERNON WOLLASTON, M.A., F.L.S.—The appearance of 'Coleoptera Sanctæ-Helenæ,' by Mr. Wollaston, the last of the many valuable contributions of its talented author to entomological science, has been sadly followed by intelligence of his decease. For the last thirty years he had suffered from weakness of the lungs, accompanied by the occasional rupture of the vessels, through which, on the 4th of January last, he passed from a life spent in valuable labour up to its latest moments. Mr. T. Vernon Wollaston, of the old family of Wollaston, of Shenton, Leicestershire, was the tenth son and fifteenth child of the Rev. Henry John Wollaston, rector of Scotter, Lincolnshire. He was born on March 9th, 1822, and educated at the Grammar School, Bury St. Edmund's, and Jesus College, Cambridge, where he continued to reside some time after taking his degree. With an inherited love for Natural History in his blood—he was great, great-grandson of Dr. Wollaston, the author of the 'Religion of Nature' (1720), and was related to William Hyde Wollaston, M.D., and vice-president of the Royal Society—it soon displayed itself in his fondness for collecting *Lepidoptera* when at school; and Mr. Wollaston soon became well known as a valued naturalist, and especially for his researches into the *Coleoptera* of the Madeiran, Canarian, and Cape Verde Archipelagos (which he personally explored, now many years ago, on a yacht voyage, in the companionship of his friend Mr. Gray), and also his investigations of their land-shells, as recorded in the 'Testacea Atlantica,' still on the verge of publication at the time of the author's decease. Mr. Wollaston's valuable writings on the enumeration, description, and critical examination of the coleopterous fauna of these islands, and especially his account of the insects of the islands of the Madeiran group, embodying in his own clear and highly-finished style the results of his personal researches, are well known to entomologists,—in the 'Insecta Maderensia,' published in 1854; the Catalogue of his own

collection of the Coleopterous Insects of Madeira, 1857; that of the 'Coleopterous Insects of the Canaries,' 1864; the 'Coleoptera Atlantidum' (enumerating those of the Madeiras, Salvages, and Canaries), 1865; and the 'Coleoptera Hesperidum,' 1867 (enumerating those of the Cape Verde Archipelago). His collections and types being purchased for the National Collection, his works on the *Coleoptera* of Madeira and the Canaries were published as British Museum Catalogues. His volume on the 'Variation of Species,' dedicated to Mr. Charles Darwin, and published in 1856, is well known. His shorter papers of original research and critical disquisition—contributed to our own, and in some cases foreign, scientific journals—range over a period of more than thirty years, beginning with Notes in the 'Zoologist,' on the *Coleoptera* of the South of Ireland, of South Wales, of some districts of the West of England, and of the South of Dorsetshire. Many papers—relative to the "Coleoptera of the Canary and Cape Verde Islands, and Madeira;" on the "Atlantic Cossonides" (to which he especially directed his attention); on "Some of the Coleoptera from the Cape of Good Hope;" with others on "Structural Peculiarities," "Variation of Species," "Revisions and Notes of Diagnostic Characters;" showing the unwearied research of their author—followed in the 'Annals and Magazine of Natural History' and other serials; till the long record of skilful labour ceased with his paper on the "Sphenophorus striatus," the recently arrived Banana weevil of Madeira, forming a contribution to the Economic branch of Entomology, of which he watched the progress with deep interest. In the autumn of 1875, feeling it desirable to seek a warmer climate, he devoted himself to utilizing his time to the utmost in scientific research, and every assistance to investigation being furnished him in St. Helena, through the assistance of Lord Carnarvon, the governor's residence ("Plantation House"), within an hour's ride of the grand central ridge, still clothed with the aboriginal vegetation, was placed at his disposal; and he devoted himself assiduously to his work, in the companionship of his accomplished wife, herself a skilful lepidopterist, and his old friend and previous companion Mr. John Gray. His wife, to whom he was married on the 12th of January, 1869, and who entered most heartily into all his pursuits as a naturalist, was a daughter of Joseph Shepherd, Esq., of Teignmouth. Of this work we have the record in the 'Coleoptera Sanctæ-Helenæ,' which may well be taken for a

model of entomological description, in its minute differentiation of the two hundred and three species found on the island, with their ordinary habitats; and full additional observations as to general points of location, distribution in the neighbouring Atlantic archipelagos, and all special peculiarities worth noting. The preface is of great general interest, pointing out the importance of the island from its extreme isolation (both by distance and the depth of the surrounding "deep-sea" soundings) in possibly throwing light on points of geographical distribution. Following up this subject in the *Coleoptera* under observation, he gives a careful elimination from the two hundred and three species known up to the 4th of September, 1875, of the fifty-seven of which the majority are well nigh cosmopolitan, and then of the seventeen more which appear to have been accidentally brought or doubtfully found on the island; and of the one hundred and twenty-nine then remaining he shows the enormous proportion of ninety-one to be *Rhynchophora*, the whole of these being either "*Cossonids* or *Anthribids*;" the latter numbering twenty-six species; the former, fifty-four. Mr. Wollaston's pages on the presence of these "wood-boring" and "foliage-loving" weevils, on an island now almost denuded of all but the remains of its ancient luxuriant vegetation, are of rare and exceptional interest, as giving a reliable observation of exact conditions at a given time, and in a perfectly isolated locality, by which the degree, coincident disappearance of aboriginal vegetation and its phytophagous tenants may be traced forwards. This, Mr. Wollaston's last contribution to entomological science, is characteristic of its author in the finished elegance, as well as clearness of its style, and in the gentleness with which, whilst he states his own views as to the doctrine "of creative arts" being not necessarily "unphilosophical," he leaves the subject open to others. On reaching Madeira Mr. Wollaston's temporary residence was unfortunately placed at too high an elevation, his health giving way, and this delayed his return; but still, as ever, this was referred to by himself as a secondary matter, except in its interference with his work. He returned to his home, at Teignmouth, in the early summer of 1877, and thenceforward devoted himself to the task of arranging the valuable mass of information he had acquired in his absence, and of which he leaves us the record. Mr. Wollaston's name will remain as a minute and accurate investigator, and clear reasoner on the results in the Science he loved so well:

devoted to it, and his friends and fellow-workers in the same wide field, his interest was unfailing in their welfare, and the advance of scientific progress. He was a man of highly refined and accomplished mind, as well as of great scientific attainments, and will be greatly missed from the ranks of our leading naturalists, as well as by those less gifted than himself, whose progress he aided by his encouragement and sound counsel.

MR. ANDREW MURRAY, F.L.S.—It was with much regret we received intelligence of the death of this accomplished naturalist, which took place at his residence, 67, Bedford Gardens, Kensington, on the 10th of January last. His health had not been strong since a severe illness following on his return from his American expedition of 1873. In the course of the last season further indisposition followed, and he gradually sank; but so assiduously occupied with his labour of scientific usefulness to his latest days, that few but those intimately acquainted with him were prepared for hearing of their close. Mr. Murray was the eldest son of William Murray, Esq., of Conland and Duncricvie, N.B., and was born in Edinburgh, on the 19th of February, 1812. Few particulars are known to us of his life in Edinburgh, where he resided till 1860; but as with most lovers of natural science this predilection asserted itself in his early years. He was educated for the law, but devoted some attention to the study of medicine, and attended the Edinburgh scientific lectures, of which, judging by the reminiscences of his later life, he must have been an attentive hearer and careful analyst. During the last few years of his life in the northern capital he was very active scientifically. In 1858 he was elected president of both the Botanical Society and Physical Society; and just previous to his removal to London he contributed an elaborate paper to the Royal Society of Edinburgh on the "Pediculi Infesting the Various Races of Man," which gave minute descriptions, and the specific variation of these creatures relative to the subject then under discussion, as to how far unity of species in the parasite showed unity of species in the animal preyed on. In 1860, as has been said, Mr. Murray came to London, and was appointed assistant-secretary to the Royal Horticultural Society. It was from this time that he devoted himself more especially to his work as a scientific botanist and entomologist, and became celebrated in the former as the monographer of the *Coniferæ*, in the latter as the monographer of the

Nitidulidæ. According to the Royal Society's Catalogue he published thirty-eight separate papers from 1852 to 1863. Andrew Murray had great scientific experience. In 1869 he accompanied Sir Joseph (then Dr.) Hooker to the Botanical Congress at St. Petersburg, as one of the representatives of British science, his services there being complimentarily acknowledged by the presentation, by the Emperor Alexander, of a malachite table of great beauty. In 1871 he was entrusted with the superintendence of the arrangements connected with British contributions to the International Exhibition of Moscow of the following year. He was secretary to the Oregon Conifer Collection Committee; and in 1873 undertook an expedition to Salt Lake and California with various scientific objects. His well-known work on the 'Geographical Distribution of Mammals' was published in 1866, in which he bestows especial attention on the habitat during geological, as well as glacial, and present epochs, with copious synonymic lists, including locality, past and present, geographical classification, and coloured maps of distribution; showing at a glance the result of his own careful research. Of Andrew Murray as a botanist, and of his connections with the Royal Horticultural Society and various botanical publications, we need not write, as it is in his course as an economic entomologist that we are most interested. In early life he aided his relative, John Murray (Lord High Advocate), in his wish to provide some practically useful reading for village schools, by writing the little pamphlet, 'The Skipjack, or Wireworm and the Slug,' which, though published without his knowledge, may be looked upon as his first contribution to Economic Entomology. He contributed many papers on Entomology to various scientific societies and publications, both home and foreign; but his great work was done in the last ten years of his life, which he devoted to illustrating the study of insects in its natural and practical bearings. It was in 1868 that the charge of receiving and arranging a government collection of Economic Entomology was placed in his hands officially. From the first he devoted himself unceasingly to the task of making this as perfect as was possible with our present knowledge, and even when on his American expedition he left the threads for its continuation. Himself an accomplished draughtsman, and a patient worker and compiler, with a great love for the subject and of general scientific research, he spared no pains in his work, whether in availing himself of scientific co-operation, or in

shaping the aid placed at his service by those less gifted than himself, in the details of field observation, and of museum illustration by coloured drawings or fac-simile modelling. This collection is already a nucleus of a very valuable, popular, and illustrated history of insect friends and insect foes; the practical value of which will generally perhaps be better appreciated in time to come, but which is already bearing good fruit for public benefit. Our countrymen in America, thanks to State help, have indeed set an example for following, and given an instance of the practical importance of Entomology. The labours of Walsh, Riley, Fitch, and Packard, leave us far behind; but the perfection of such a collection as the one now under government control would be a worthy exponent of practical Entomology in Britain. On this collection, of which one hundred and fifty cases are more or less complete, Mr. Murray was working up to his latest days, leaving a large collection of oak-galls and illustrative drawings still in progress of arrangement. To assist in the circulation of information a series of guides to the collection were projected. These were to take the form of popular handbooks to Entomology, and were to be prepared by Mr. Murray, and published under government supervision. Of the eight intended volumes one only has appeared: this treats of the wingless species, or *Aptera* (it was reviewed, Entom. x. 102). In Mr. Murray we have lost a man of varied accomplishments, a good botanist, and a good entomologist, especially with reference to *Coleoptera*. Those who knew him well, and they were many, will feel his loss, not only as a gifted naturalist, but as a true-hearted friend and an admirable man.—E. A. F.

JAMES ROBINSON.—After a painful illness there died at York, on the 14th of last October, James Robinson, aged fifty-nine years. For the last twenty-four years he was well known in the North of England as a careful collector and patient observer of *Lepidoptera*. All the spare hours from his work, as a cabinet-maker, were spent in following his favourite pursuit of Natural History. Born at Ripon, and living in York most of his life, he restricted his observations almost entirely to his native county; but there are few localities, reasonably accessible, near York, which he has not explored by night or by day. Being a genial companion, and always ready to impart to others the knowledge gained by hard experience, he is much missed by the little band of workers in Natural Science at York.—ED.



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COLIAS EDUSA.

By EDWARD A. FITCH.



Egg of *C. Edusa* magnified; eggs (slightly magnified) on clover leaf; portion of egg, showing the converging longitudinal ribs. Pupæ of *C. Edusa*: dorsal and lateral view.

THE unusual abundance, or abnormal occurrence, of certain insects in certain years, has long been a subject for varied hypotheses and speculations. Some have been disproved, others to a certain extent explained by a better acquaintance with the economy of the noted species; *e.g.*, the swarms of *Aphides* being followed by the swarms of *Coccinellidæ*, *Syrphidæ* and *Hemerobidæ*, is a familiar instance of the inspired aphorism that—"Wheresoever the carcass is, there will the eagles be gathered together." The occasional swarms of certain *Diptera* are also explicable by reference to their economy. Amongst *Lepidoptera* our two species of *Colias* have been noted *par excellence* for their periodic appearance. The older observers, believing in a hard-and-fast line, summarised that period as triennial, quadriennial, quinquennial, or septennial, each period being defended according to the immediate, though limited, experience of the individual. Mr. Desvignes' septennial theory still lingers, probably owing

more to its association with that mystical number than any actual experience :—

“ Of every beast, and bird, and insect small,
Came *sevens* and pairs.”—MILTON.

These periods were supposed to be influenced by the eggs or pupæ of the species lying dormant; but our knowledge of *Colias* will warrant us in considering them all as arbitrary and unsupported by facts. We know that many *Lepidoptera* pass two or more years in the penultimate state, *Bombyces* especially, and that some few take more than one year to complete their metamorphosis. These species are very probably affected in their appearance meteorologically, as no doubt is *Colias*; but we want more knowledge of our two species to say that the favourable conditions are this only.

In 1872 we were astonished by an unusual abundance of *Vanessa Antiopa*. Of late years we have had many well-attested observations of the migration of butterflies; and it is this which probably affects the appearance of *V. Antiopa*, *Pieris Daphnidice*, *Argynnis Lathonia* (all unusually abundant in the autumn of 1872), and other *Lepidoptera*, in Britain. Some few find the conditions of their new establishment favourable, and establish themselves; but probably unless strengthened by new recruits every now and again we should soon lose these and other species from the British fauna. *C. Edusa* has been met with more than once in the English Channel travelling from the Continent. The following is on the excellent authority of Mr. Charles Darwin, when on his ‘Beagle’ voyage:—“One evening, when we were about ten miles from the Bay of San Blas, vast numbers of butterflies, in bands or flocks of countless myriads, extended as far as the eye could range: even by the aid of a glass it was not possible to see space free from butterflies. More species than one were present, but the main part belonged to a kind very similar to, but not identical with, the common English *Colias Edusa*.” It is these migratory habits and a strong constitution which account for the extended geographical distribution of *Colias*. *Edusa* and *Hyale* are both common to the three continents of the Old World, and very closely-allied species are found in the New. Although originally an immigrant, from the great abundance and distribution of *C. Edusa* in Britain and Ireland, it may now be considered as thoroughly naturalised; and the numerous specimens captured last year were doubtless mostly British born. Of these I have seen some hundreds of specimens, and they vary in almost every conceivable detail.

Size.—From 1·25 to 2·4 inches. I think I have seen larger, but this was the largest measured; a male. Mr. E. Boscher took a male as late as November 13th, at Bognor, which measured 2·25 inches.

Shape.—This varies considerably, especially in the hind margin of the fore wings, which is either rounded, straight, concave or convex, and curved; the inner margin also varies slightly, as do the shape of the hind wings.

Colour.—This is also subject to much variation. The brilliant saffron or orange varies in intensity, and there is the permanent greenish white variety of the female (*Helice*, Hüb.); intermediate shades between these two, through pale yellow, are to be met with, and many specimens have been taken in 1877 with the hind wings and the fore wings differing, a few even with one wing only varying in shade. Some specimens are beautifully “shot” with purple or blue. The females of nearly all the *Coliades* seem dimorphic as to colour: in 1875 I took the pale and yellow females of *C. Hyale*, about which there was some doubt.

Fore wings.—The marginal band in the male varies slightly in shape, much in width, and in the intensity of its colouring, owing to the greater or lesser number of the yellow scales, and the conspicuity of the wing-rays; also in its continuity along the inner margin. A specimen or two has occurred in which this band is bordered with yellow on the hind margin. In the female the light spots in the margin vary from almost a continuous band to entire absence. A beautiful variety of *Hyale*, with a continuous pale band at the apex of the fore wings, taken at Market Harborough in August, 1842, is figured in the ‘Zoologist’ (vol. i., p. 259). The central black spot is altogether irregular in shape, and varies greatly in size. I have seen one or two specimens in which it is almost entirely obliterated; a few in which it has a more or less well-defined yellow centre. The presence of black scales, especially on the wing-rays, is not uncommon: in some varieties they are very conspicuous.

Hind wings.—The marginal markings vary greatly, especially in the female. The central orange spot also varies much in shape, size, and relative intensity of colouring; it is normally conduplicate, but many varieties occurred last year in which it was very small and single.

Such are the most important points of variation which have come under my notice. A few suffused varieties have been met with, and some specimens are beautifully bright red at

the base of the costa and on the prothorax. Suffusion is probably more or less common to all species; and Mr. W. H. Edwards considers the application of severe cold to the pupa as a cause (Can. Ent. ix. 203). I heard of no monstrosities last year; but a specimen with three wings female, and the fourth (left fore wing) male, is recorded in



COLIAS EDUSA (third brood, male).

the 'Entomologist' (vol. v., p. 447). Twelve varieties are figured in the accompanying plate, but it has been difficult to select from the numerous beautiful specimens which have been kindly placed at our disposal. Especial thanks are due to Mr. Bernard Cooper; to Mr. Eedle; and to Mr. Meek for procuring the four varieties belonging to Mr. Harper.

DESCRIPTION OF PLATE.

Mr. H. T. Mennell's suffused female. Taken by himself at Bognor, Sussex, August, 1877. Unfortunately not a good specimen.

Mr. C. A. Briggs' very dark bordered female. Taken at Folkestone, Kent, in 1877.

Mr. C. A. Briggs' very light bordered female. Taken at Folkestone, Kent, in 1877.

Mr. B. Cooper's pale saffron variety. Taken at Green Street, near Sittingbourne, Kent.

Mr. P. H. Harper's female variety, with fore wings *Helice*, and hind wings *Edusa*. Taken near Enfield, Middlesex, in 1877.

Mr. P. H. Harper's very curious pale *Helice*. Taken at Brighton, Sussex, in 1877.

Mr. W. H. Harwood's female, varying curiously in shape and in the spots in the fore wings. Taken near Colchester, Essex, August, 1877.

Mr. P. H. Harper's variety, with the tip of the fore wings suffused to the central spot. Taken at Brighton, Sussex, in 1877.

Mr. P. H. Harper's female variety, with curious pale markings in the border of the hind wings. Taken at Brighton, Sussex, in 1877.

Mr. T. Eedle's small female of the third brood; bred. A curiously-shaped male of the same brood is figured in the woodcut.

Mr. W. P. Weston's curious specimen, with the right side *Helice*, and left side *Edusa*. Taken at Finchley, Middlesex, 7th August, 1876.

Mr. B. Cooper's large dark bordered *Helice*. Taken in Kent in 1877.

The species of *Colias* inhabiting Europe have been split up into about thirty species by different authors. Standinger

retains seventeen; Kirby enumerates fifty-five, twelve of which are European. Could we but get series of each supposed species, such as could be procured of *C. Edusa* this year in Britain, and allowing for the variation attributable to geographical distribution or climatal causes, it is more than likely that the most discriminating speciologist would be baffled. As an instance of community of descent the series would be perfect. Should a great *Hyale* year, as were 1842 and 1868, occur before our *Edusa* experience is forgotten, we may probably deduce some knowledge from our own two species. We certainly now have *C. Edusa* varieties resembling in almost every detail *Chrysotheme*, Esp., *Myrmidone*, Esp., and even the light yellow *Erate*, Esp. I have also seen several males with such a distinct purple gloss, and with the mealy borders to the wings, that they certainly approach *Aurorina*, H.-S., though perhaps in a mild form. It has been said that *Erate* is a hybrid between *Edusa* and *Hyale*; it is most certainly a connecting link between the two species.

"The boundaries (*grenzen*) between the species of this genus (*Colias*) are very uncertain; the more one compares examples from various localities the more inconstant appear the specific characteristics, which suffice to distinguish the ordinary species" (Schmetterlinge von Europa, vi. 21). So says Dr. Herrich-Schäffer in his beautiful work. The clouded yellows are generically identical, but as our knowledge of them increases the question will soon develop itself—Are they specifically dissimilar? Many which are now recognised as good species will, like our *Helice*, have to descend from specific to varietal rank. Were our small, pale, narrow-bordered, third brood of 1877 perpetuated in a higher latitude or altitude, we should probably have quite as distinct a race as any known *Colias*. In 1877 *Helice* was taken *in cop.* with male *Edusa*; and, what is more convincing, I learn through Mr. Meek, that Mr. Gates, of Brighton, bred a male *Edusa* from an egg laid by *Helice*. From eight or ten eggs only one reached the pupa state.

Before summarising last season's results a retrospect of the occurrence of the species in Britain may not be without interest. *C. Hyale* was common in 1821, 1826, 1828, 1835, 1842 (particularly so, but no *Edusa* seen), 1843 (many, also *Edusa*), 1844 (several, *Edusa* much the commoner, as in 1843), 1847; in 1849 there were a few, 1851 (one record), 1855 (rare, *Edusa* common), 1856 (two records), 1857 (very common, as also was *Edusa*), 1858 (common), 1859 (one record), 1867

(one record), 1868 (very abundant, *Edusa* was not common), 1869 (one record), 1870 (scarce), 1872 (common, not so *Edusa*), 1875 (abundant), 1876 (common). *C. Edusa* was abundant in 1804, 1808, 1811, 1825 (one), 1826 (very abundant), 1831 (plentiful), 1833, 1835 (both species common), 1836 (common), 1839 (common, many in June), 1843 (abundant), 1844 (very common), 1845 (scarce), 1847, 1848 (one record), 1851 (one record), 1852, 1855 (common), 1856 (common), 1857 (very common, recorded to November 18th), 1858 (very common, particularly in June, also to November 7th), 1859 (very abundant), 1861 (scarce), 1862, 1865 (common), 1867 (several), 1868 (common, but *Hyale* much more so), 1869 (several), 1870 (scarce), 1871 (one record), 1872 (not uncommon), 1875 (very common), 1876 (common). These records are collated from the 'Magazine of Natural History,' the 'Entomological Magazine,' the 'Entomologist,' the 'Zoologist,' the 'Entomologist's Weekly Intelligencer,' the 'Weekly Entomologist,' and the 'Entomologist's Monthly Magazine.' They are ample to show distinctly the capriciousness of the occurrence of these two insects in Britain.

The following are selected records for 1877:—

BUCKS.—Common near Marlow, from beginning of August to end of September; fifty-five taken; *Helice* occurred in about the proportion of one to twenty: F. N. Jackson.

CARNARVON.—A freshly-emerged *Helice*, taken at Bangor on 3rd October; the only *Edusa* seen in Wales during a fortnight's stay: S. D. Bairstow.

CORNWALL.—Common at Penzance, also seen within a short distance of the Land's End; second week in September: H. Miller, jun.

DERBY.—Taken in Darley Abbey Gardens; last taken 9th September: S. J. Rowberry.

DEVON.—A tattered individual, seen near Torquay, about the 5th or 6th May; several fine bright males seen at the end of the month, and the species became common by the middle of June; very abundant during the summer; several seen on October 14th; the last on October 29th: G. B. Corbin. A friend tells me *Edusa* was out and common, at Sidmouth, the second week in October: H. T. Dobson, jun.

DUMFRIESSHIRE.—Common this year throughout the district; not seen previously since 1862; first seen June 3rd; in scanty numbers throughout June, July, and August; the autumn brood was very common from September 10th to October 9th: R. Service.

ESSEX.—Seen on the wing, but very much worn, on October 8th and 14th; and on October 24th a fresh male was caught at Wrabness, near Harwich: F. Kerry. Common at Walthamstow; last noticed October 5th; one *Helice* taken September 15th: B. Cooper.

GLOUCESTERSHIRE.—Very common near Ailberton and Lydney; first seen June 3rd; it disappeared from the first week in June to the end of July; from then to October 3rd, very common; only one *Helice* seen, October 2nd: Rev. D. G. L. Browne. Common at Wotton-under-Edge until October 4th, on which day I took five specimens: V. R. Perkins. At Cheltenham, in September: Rev. D. G. L. Browne.

HANTS.—Abundant at Lyndhurst; last seen October 3rd: H. Golding-Bird. Seen near Buriton on October 6th: F. N. Jackson. Very abundant in July and August: G. B. Corbin.

HEREFORDSHIRE.—Very common in August and September, commoner than whites; I saw one in the centre of the city of Hereford: J. B. Pilly. First observed June 8th; last seen October 9th: Rev. C. Kengelbacker. Common on June 10th; seen previously; one taken by my brother the last week in May: P. H. Horne.

ISLE OF WIGHT.—I saw several worn *Edusa* and one *Helice* at St. Helen's, on September 26th: H. Golding-Bird.

KENT.—Swarmed at Herne Bay in August; my brother took a fine series of *Helice* there: B. Cooper. Folkestone, equally fresh specimens taken the first week in June, August, and October; very common on October 20th; two specimens taken just after emerging, on the morning of October 2nd: W. Blackall. Very abundant at Ramsgate and Margate; last seen September 15th: R. T. Gibbons. Very abundant at Folkestone; seventy-eight captured during September, also *Helice*; one taken on November 4th, very fresh: W. J. Austen. In great numbers round Strood; I know of one thousand five hundred captures, including twelve or fourteen *Helice*; second brood appeared at the end of July; one captured November 2nd: J. Ovenden.

KIRCUDBRIGHTSHIRE.—At Arbigland, on the Galloway coast, I was told by the gardener it outnumbered the common whites: R. Service.

LEICESTERSHIRE.—Very common round Leicester, one was taken in the centre of the town itself; first seen June 9th, three taken in the month; not seen in July; fifty-seven *Edusa* and

one *Helice* taken in August; thirty *Edusa* and two *Helice* taken in September; last seen September 24th: J. T. Elkington.

MIDDLESEX.—Nine seen on May 23rd, ?at Hampstead: L. Fox. Very abundant, in August and the beginning of September, on the marshes and railway banks near Lea Bridge: C. J. Biggs.

OXFORDSHIRE.—Near Woodstock, in August: C. L. Adams.

NORFOLK.—Excessively abundant; taken at Costessey, end of May; plentiful throughout August from Norwich to South Walsham; also plentiful at Cromer, on the coast; I have only heard of one *Helice*, which was taken at Norwich; last seen, October 5th: R. Laddiman.

SHROPSHIRE.—Several taken at Walford, near Shrewsbury, June, September, and October 14th: C. L. Adams.

SOMERSET.—Abundant at Castle Cary; last seen, September 22nd; W. Macmillan. One seen, October 5th; and another, October 24th: W. J. Allen.

STAFFORDSHIRE.—In North Staffordshire in June and August: Rev. T. W. Daltry.

SUFFOLK.—Plentiful at Lowestoft: R. Laddiman. Common at Clacton-on-Sea to September 28th; I saw a lively male at Ipswich on October 20th: H. Miller, jun.

SURREY.—New Malden; first seen June 3rd, abundant by 11th; second brood, first seen, July 29th; in enormous numbers from then to August 21st; one *Helice* taken: H. T. Dobson, jun.

SUSSEX.—Several, in fine condition, on June 4th, at Eastbourne; of this early brood I know of four captures of *Helice*; second brood, first noticed on July 30th; of this brood I have captured several *Helice*; last seen, October 3rd: G. F. Gottwaltz. Very common, near St. Leonard's, from June 3rd to October 19th, when it was still in good condition; many *Helice* seen and taken, commoner the first part of the season: E. K. Robinson. For Miss R. M. Sotheby's Hastings record, see *infra*.

YORKSHIRE.—A male seen on June 3rd, in York; no more seen till the end of August; August and September several taken; last seen, September 29th: T. Wilson. Several, near Driffield, in September; last taken, September 27th: G. R. Dawson. On September 28th, near Sheffield: W. Sheldon. I saw *Edusa* on September 28th: W. Simmons. Several taken near Leeds: C. Smethurst.

Many of the above contributors speak of the preponderance

of males in the early part of the flight-time, and of the females later. The total absence of *C. Hyale* is also noticed by several. Very many other occurrences have come to my knowledge privately, but they are not included, as the distribution has been general, extending from Orkney (W. Tait) to Land's End (H. Miller), and from Pembroke (C. G. Barrett, in E. M. M.) to Lowestoft (R. Laddiman). The above, together with the records of the early appearances, which are tabulated in the July and August issues (Entom. x. 187, 209), are ample to show the comparative earliest and latest dates; also the occurrence of *Helice*. The comparative absence of life-history notes is to be regretted. If the collectors, who now boast of their one, two, or even three thousand specimens, had set apart but one day to the obtaining of eggs, it is evident that both themselves and their favourite Science and pursuit would have been benefited and rewarded. What 1877—the great *Edusa* year—lacked, 1878 should have been able to make good. From the number of specimens taken there certainly ought to be ample materials for a continuation of the species in entomologists' hands, either as eggs, larvæ, pupæ, or hibernating imagos. *Prudens futuri*. Where are they?

In addition to published notes in the 'Entomologist' (Entom. x. 210, 285), the following relate to life-history:—

I obtained about twenty eggs from two females, about August 5th or 6th. These hatched in about twelve or fourteen days, and fed till October 7th, when one changed to pupa. The others unfortunately died, from some cause not known to me, after the last change of skin. A male *Edusa* emerged from the said pupa on the 2nd of November. —JOSEPH OVENDEN.

I took a worn female *Edusa* at St. Helen's, Isle of Wight, on September 26th, which I put under a net. In a short time it laid about twenty eggs, and a few more the next day. They were laid on two species of clover, and also on the net, one by one. They have since all collapsed.—H. GOLDING-BIRD.

On September 6th I captured a female, which I pill-boxed, and afterwards placed under a glass cylinder, with a sprig of clover in blossom. On the 13th I found she was dead, and had deposited about fifteen eggs, which commenced to hatch on the 17th. I supplied them with a growing plant of clover, upon which they commenced feeding but very slowly; and I have at the present date one or two larvæ remaining,

which are not more than half an inch in length, the rest having all died.—C. J. BIGGS (October 17, 1877).

Mr. W. H. Harwood had larvæ this autumn, which all died before changing. However, one was feeding as late as December 21st.

My own notes are as follows:—

Wild specimens seen on June 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 28th, 30th; July 2nd, 3rd, 30th, 31st; every day in August but the 10th, 25th, 26th and 27th; September 1st, 7th, 10th, 11th, 17th, 18th, 19th, 22nd, 26th; October 6th, 19th. Allowing for absence from home and other causes this shows almost a continuous occurrence from June 6th to October 19th; the only break being through July. The first female I took on June 6th I confined, with two others taken subsequently, over growing plants of *Trifolium* (var. spp.), *Medicago* (var. spp.), and *Lotus corniculatus*. The first captured female, only, laid eggs. These were deposited, as described in Newman's 'British Butterflies' (p. 144, and see figure), on the trefoil (*Medicago lupulina*), on June 8th, and numbered upwards of two hundred. The eggs hatched on June 14th, and the two first larvæ fixed for changing on July 7th. This operation was completed (visibly) by the 9th. The two first imagos emerged on July 21st. The most accelerated metamorphosis thus occupied forty-three days from the egg-laying, thirty-seven from hatching; and the most prolonged occupied sixty-eight days from the egg-laying. I can speak to this decidedly, as I had not a single dead pupa, neither did I have a cripple emerge, or any semblance of a variety. The brood, I am afraid, was kept much too natural for this. The record of emergence is:—July 21st, two males; 22nd, one male; 23rd, five males; 24th, four males and three females; 25th, five males and four females; 26th, one male and six females; 27th, four males and twelve females; 28th, two males and six females; 29th, four males and three females; 30th, three males and three females; 31st, five males and five females. August 1st, four males and three females; 2nd, one male and two females (fourteen pupæ distributed); 3rd, two males and one female (four pupæ distributed); 4th, one male and two females; 5th, one male; 6th, one male and two females; 7th, one male; 8th, two males and two females; 9th, one female; 11th, one female; 15th, one female. In all, forty-nine males and fifty-seven females. On the 27th July I put some of these bred pairs under various cages in a lucerne

field, the "bottom" of which was thick white clover (*Trifolium repens*) on bloom. Eggs were deposited by the 29th, and plentifully on the 30th. On August 7th I first noticed the young larvæ; they then swarmed. I occasionally looked at them from time to time, and all went well till August 22nd: the heavy rain on that day, and on the 25th to 27th, decimated them considerably; the cages, which were covered mostly with various materials, from leno to calico, were a hurtful shelter; drying under them was difficult, and almost impossible. However, from this time they were left very much to themselves, and in consequence were preyed upon voraciously by the woodlice (*Oniscidæ*), which swarmed in their cages, and the slugs were by no means their friends. Another time I could manage better; striving to be strictly natural to such a wayward species was the cause of my failure. I had but one of these numerous larvæ turn to a pupa, as far as I could find. On September 24th I found this being devoured by two fat *Onisci*, which I need hardly say were hung, drawn, and quartered on the spot. Mr. Purdey gave me a pair of *Edusa*, which had been taken *in cop.*, at Folkestone, on November 4th. These I endeavoured to keep alive, hoping for eggs; but the female died, November 18th, and the *post mortem* showed her to be quite empty. After a week's absence, on my return home on December 11th, the male was just alive; the next day it died; possibly while its keeper was away it had missed its "drops," of which it used to imbibe most freely.

This—with Miss Sotheby's very full record, which appears below—is the experience of *Edusa* in 1877, one of the wettest and most sunless years remembered for some time, and one in which the honey harvest has been bad, the fruit harvest worse, and the corn harvest the worst known since 1843; insects of all orders were scarce, many noticeable by their almost total absence,—wasps for instance. In such a season, and with the present limited state of our knowledge of *Colias*, it is useless to attempt to assign a cause for its inordinate abundance, and this in one species only. I cannot hear of ten undoubted specimens of *Hyale* being seen, and these, I believe, all occurred in June. Where was the diversity of influence on the two closely-allied species?

In the September 1876 'Entomologist' (ix. 202) I ventured an opinion that *Colias* was double-brooded, and had not a hibernating imago. The prophecy as to its abundance was fulfilled. The enquiry as to its autumn egg-laying was

confirmed (Entom. ix. 256, 257). At the first subsequent opportunity I ventured to solve my own problem, and not without some success. Above I have given a tolerably complete history of two broods.

The year 1877 has taught us that *C. Edusa* is normally double-brooded, and occasionally triple-brooded. But how does it pass the winter? As an egg, as now instanced; as a larva, as related by the Rev. J. Hellins (E. M. M. vi. 232); as a pupa, as related by Mr. C. W. Dale (Id. v. 77); or as an imago, as related by Mr. J. Cranstone (Ent. Intell. ii. 11) and Mr. R. R. Harvie (Id. ix. 179)? This point shall be returned to; but enough has been said to show the necessity of more observers.

Maldon, Essex, January 1, 1878.

HASTINGS, 1877.—In August and September last *Colias Edusa* was very abundant in this neighbourhood, and amongst them I was fortunate enough to capture eight of the variety *Helice*, all in a perfect condition, and one of which is of a bright saffron-colour. A friend who was with me at the same time also succeeded in taking six *Helice*. On the 17th of October I captured four, all very perfect; one of them when taken had the empty pupa-case beside it, and its wings were quite limp. On the following day I took another, also with the pupa-shell beside it. The last *Edusa* taken was on the 17th of November, when I left the neighbourhood. This, notwithstanding the lateness of the season. The following is my full record:—August 2nd, seven specimens taken; 3rd, seven; 4th, fourteen; 6th, twelve; 7th, eighteen, and one *Helice*; 8th, fourteen; 9th, nine; 10th, twelve, and one *Helice*; 11th, five; 13th, eight; 14th, eight; 15th, two; 16th, three, *Edusa* eggs laid; 17th, ten; 18th, sixteen; 20th, twenty-six, and one *Helice*; 22nd, *Edusa* larvæ out; 23rd, fifteen; 24th, six, and one *Helice*; 25th, six, and one *Helice*; 30th, five, and one *Helice* (saffron colour). September 1st, eleven, and one *Helice*; 5th, two, and one *Helice*; 6th, thirteen, *Edusa* eggs laid; 7th, four; 11th, four, and two *Edusa* larvæ; 16th, larvæ out; 18th, one nearly full-fed larva taken; 27th, first larva fixed for changing; 29th, three, first larva turned to pupa. October 5th, eight, second larva fixed for changing; 6th, two; 7th, second larva turned to pupa; 9th, two; 10th, four; 11th, eight; 17th, four, one just out, with pupa-shell; 18th, eight,

one just out, with pupa-shell; 20th, seven; 24th, two; 26th, thirteen, twenty-four seen and taken; 28th, five; 30th, three; 31st, seven, ten seen and taken, imperfect. November 1st, nine, nineteen seen and taken; 2nd, four, eggs laid; 3rd, ten, eighteen seen, first pupa showing colour; 5th, fifteen, second pupa showing colour; 6th, first imago out from larva taken September 18th, female; 8th, eight; 10th, one; 13th, five; 16th, second imago out, very small, male; 17th, one; 18th, eggs laid. On the 6th and 7th of August I captured five or six specimens of *C. Edusa*, which I placed in a large band-box covered with muslin, keeping them regularly supplied with fresh lucerne (*Medicago sativa*) and red clover (*Trifolium medium* and *T. pratense*), sprinkled daily with sugar and water. I allowed them as much sun and air as possible; and on the 16th of August the first eggs were laid. They stood upright on the food-plant, as described by Newman, like ninepins, pointed at each end, white in colour, with a faint yellow tinge. On the second day they changed to a rich orange, and afterwards, at an interval of six days, to black, which just before the larvæ emerged had a metallic appearance. This was on the 24th. I fed the young larvæ entirely on lucerne, separating a few to note the changes, which I have endeavoured to describe as accurately as possible. When hatched the larvæ were of a dingy green colour, which they retained until their first moult, which took place on the 2nd of September. They then changed to a bright green, closely resembling the tint of the lucerne leaves. The second moult was on the 11th of September; the third on the 19th; the fourth on the 27th; and the fifth and last on the 7th of October. At the fourth change a white narrow line was plainly visible along each side, having a reddish spot at each of the twelve segments. They did not differ at all at the last change, except that the line and spots became more distinct. Before each moult I noticed the larva attached itself by threads to the leaf. I had about thirty larvæ, which were nearly full-fed, and about eighty others of all sizes; of these, two, which I had taken in the lucerne field, changed to pupæ on September 29th and October 6th, securing themselves before doing so to the lucerne or to the lid of the box, in the same way as the *Pieridæ* do. Unfortunately the others, whose life-history I have recorded, all died before turning to pupæ.—ROSA M. SOTHEY; Sunnyside, Ore Valley, Hastings.

A LIST OF NEW SPECIES OF COLEOPTERA,

WHICH HAVE BEEN ADDED TO THE BRITISH FAUNA DURING THE YEARS 1872 AND 1877 INCLUSIVE, WITH NOTICES OF THE PRINCIPAL CHANGES OF NOMENCLATURE OF OTHERS; BEING A CONTINUATION OF THE CATALOGUE CONTAINED IN THE 'ENTOMOLOGIST'S ANNUAL' OF 1872, UP TO DECEMBER 31, 1877.

By JOHN A. POWER, M.D.

THE abbreviations and arrangements adopted in this list are the following:—

1. The numbered species are insects absolutely new to the British Catalogue, having been discovered independently, or diagnosed from other cognate but known species with which they had previously been mixed up in the collections.

2. The non-numbered species, printed in italics, refer to insects which are supposed to have been inaccurately determined, but have already appeared in the British lists, though under other names, several of them being even advanced to the rank of new species, for reasons stated in the references.

3. The sign * indicates that the insect is almost certainly only an accidental introduction, without any satisfactory history, and has little or no claim to be called British. The sign † indicates that the insect is probably by no means indigenous, but more or less completely naturalised.

4. Mag. is the 'Entomologist's Monthly Magazine,' followed by the volume and page where the notice occurs. An. is the 'Entomologist's Annual,' followed by the year and page of the notice.

5. The name attached to the species is that of its author or describer. The second name is that of the person who first published the insect as British and determined its species, unless otherwise stated. The names following the references are those of the locality of the insect, and of the persons who actually found it.

6. The last number is that of the year in which the publication of the name, or change of name as British, occurred. When the number of known species is very limited, I have noticed it. The arrangement followed is that of Dr. Sharp's Catalogue.

Dromius vectensis, Rye.—E. C. Rye, Mag. x 73, and An., 1874, 76, known and registered as *D. oblitus*, *Boield.*, in

Crotch and Sharp Cat., determined as new species by E. C. Rye. 1873.

1. *Amara continua*, *Thoms.*—E. C. Rye, *Mag.* ii 207, a new species, separated by Thomson from *A. communis*. 1875.

2. *Harpalus quadripunctatus*, *Dej.*—T. Blackburn, *Mag.* x 68, and *An.*, 1874, 78. Braemar, T. Blackburn and G. C. Champion. 1873.

Bembidium 14-*striatum*, *Thoms.*—E. C. Rye, *Mag.* x 137, and *An.*, 1874, 80 = *B. var. velox*, *Er.* 1873.

Ilybius ænescens, *Thoms.*—E. C. Rye, *Mag.* ix 36, 60, and *An.*, 1873, 22 = *J. angustior*, *Gyll.*, probably. 1872.

3. *Philhydrus suturalis*, *Sharp.*—D. Sharp, *Mag.* ix 153, and *An.*, 1873, 22, a new species, separated by Sharp from *P. marginellus* of collections. 1872.

4. *Helophorus tuberculatus*, *Gyll.*—E. C. Rye, *Mag.* xi 135, 235. Manchester and Scarborough, J. Chappell and T. Wilkinson. 1874.

5. *H. planicollis*, *Thoms.*—T. Blackburn, *Mag.* xiii 39. Ireland and Scotland. 1876.

6. *H. æqualis*, *Thoms.*—T. Blackburn, *Mag.* xiii 39. Ireland and England. 1876.

7. *H. brevicollis*, *Thoms.*—T. Blackburn, *Mag.* xiii 39. Killarney, T. Blackburn. 1876.

8. *H. strigifrons*, *Thoms.*—T. Blackburn, *Mag.* xiii 40. Scotland and Ireland. 1876.

9. *H. laticollis*, *Thoms.*? (*Idæ*, *J. A. Power*, MSS.).—E. C. Rye, *Mag.* xiii 40, is *Heloph. nov. species*, *Sharp Cat.* *J. A. Power*, Woking. 1876.

10. *Leptusa testacea*, *Bris.*—E. C. Rye, *Mag.* ix 5, and *An.*, 1873, 22. Whitstable, G. C. Champion. *One specimen.* 1872.

11. *Aleochara hibernica*, *Rye.*—E. C. Rye, *Mag.* xii 175. Co. Down, Ireland, G. C. Champion. *One specimen.* 1876.

12. *Homalota egregia*, *Rye.*—E. C. Rye, *Mag.* xii 176. Caterham, G. C. Champion. *One specimen.* 1876.

13. *H. difficilis*, *Bris.*—D. Sharp, *Mag.* viii 247, and *An.*, 1873, 23. G. R. Crotch and G. C. Champion. 1872.

14. *H. humeralis*, *Ktz.*—D. Sharp, *Mag.* viii 247, and *An.*, 1873, 23. Cirencester, Dr. McNab. 1872.

15. *H. fimorum*, *Bris.*—D. Sharp, *Mag.* viii 274, and *An.*, 1873, 23. Norfolk, G. R. Crotch. 1872.

16. *H. atrata*, *Man.*—G. C. Champion, *Mag.* viii 247, and *An.*, 1873, 24, determined by D. Sharp. Lee, G. C. Champion. 1872.

* 17. *Leistotrophus cingulatus*, *Grav.*—Rev. A. Matthews, Mag. xiv 38. Devonshire, Rev. H. Matthews. *One specimen.* North America. 1877.

18. *Scopæus Ryei*, *Woll.*—T. V. Wollaston, Mag. ix 34, and An., 1873, 24. Slapton, T. V. Wollaston. 1872.

19. *S. subcylindricus*, *Scrib.*—E. C. Rye, Mag. x 138, and An., 1874, 82. Ascribed to England in 'L'Abeille.' 1873.

20. *Lithocharis picea*, *Kltz.*—E. C. Rye, Mag. ix 156, and An., 1873, 24. Bexley, G. C. Champion. 1872.

Acidota ferruginea, *Er.*—E. C. Rye, Mag. ix 190, and An., 1874, 82. Scarborough, R. Lawson, probably is *var.* of *A. cruentata*. 1873.

Bryaxis cotus, *De Saulc.*, &c. (Sharp MSS.).—D. Sharp, Mag. xii 225, is *B. Lefebvrei* of Sharp Cat., returned as a new species by M. de Saulcy. 1876.

21. *Euplectus Abeillei*, *De Saulc.*—D. Sharp, Mag. xii 225, returned as such by M. de Saulcy. Mickleham, D. Sharp. *Two specimens.* 1876.

22. *E. piceus*, *De Saulc.*—D. Sharp, Mag. xii 125, returned as such by M. de Saulcy. New Forest, D. Sharp. 1876.

23. *E. Duponti*, *Aub.*—D. Sharp, Mag. xii 225, returned as such by M. de Saulcy. Scarborough, R. Lawson. 1876.

24. *Scydmenus helvolus*, *Schaum.*—D. Sharp, Mag. xii 225, returned as such by M. de Saulcy. 1876.

25. *S. Sharpi*, *De Saulc.*—D. Sharp, Mag. xii 225, returned as such by M. de Saulcy. R. Lawson. 1876.

S. glyptocephalus, *De Saulc.*—D. Sharp, Mag. xii 225, returned as such by M. de Saulcy, is *S. carinatus* of Sharp's Cat. and of List, An., 1872, 165. 1876.

26. *S. præteritus*, *Rye.*—E. C. Rye, Mag. ix 6, and An., 1873, 25. Croydon and Seaford, on chalk, E. C. Rye and E. Waterhouse. 1872.

Trimium brevicorne, *Reich.*—D. Sharp, Mag. xii 225, is male of *T. brevipenne*, *Chaud.*, which, therefore, must be omitted. 1876.

27. *Trichopteryx carbonaria*, *Matthews.*—Rev. A. Matthews, Mag. ix 179. Thoresby, Rev. A. Matthews. *One specimen.* 1873.

28. *Ptilium cæsum*, *Er.*—Rev. A. Matthews, Mag. ix 179, and An., 1874, 84. Cambridge, Crotch. *P. cæsum* of former lists is *P. inquilinum*, *Er.* = *P. myrmecophilum*, *All.* 1873.

29. *Anisotoma lunicollis*, *Rye.*—E. C. Rye, Mag. viii 203,

and ix 136, and An., 1873, 25. Lancashire, Scarborough, and Forest Hill, J. A. Power, R. Lawson, Marsh. 1872.

30. *A. brunnea*, *Sturm.*—E. C. Rye, Mag. ix 135, and An., 1873, 26. Scarborough, R. Lawson. 1872.

31. *A. macropus*, *Rye.*—E. C. Rye, Mag. x 133, and An., 1874, 87. Claremont, G. C. Champion. 1873.

32. *A. curta*, *Fair.*—E. C. Rye, Mag. xii 150. Norwich and Esher, Rev. L. Brown and G. C. Champion. *Two specimens.* 1875.

33. *A. clavicornis*, *Rye.*—E. C. Rye, Mag. xii 150. Duffries, D. Sharp. *One specimen.* 1875.

Hydnobius spinipes, Gyll.—E. C. Rye, Mag. viii 204, and An., 1873, 25, is probably a large *H. strigosus*, *Schm.* 1872.

Colon Barnevillii, Ktz.—E. C. Rye, Mag. xii 177, was returned as such by M. Tournier, but is probably undeveloped form of *C. Zabei*, *Krtz.* 1876.

* 34. *Platysoma oblongum*, *Fab.*—J. Chappell, Mag. xii 62, no doubt accidental. No history. 1875.

35. *Phalacrus Brisouti*, *Rye.*—E. C. Rye, Mag. ix 8, and An., 1873, 26, returned as new by M. Tournier, and described as new species by E. C. Rye. Deal, Lee. 1872.

P. Humbertii (Tournier MSS.).—E. C. Rye, Mag. ix 37, and An., 1873, 27, returned as such by M. Tournier, is probably a small *P. corruscus*, Mag. xii 177. 1872.

Olibrus particeps, Muls.—E. C. Rye, Mag. ix 38, and An., 1873, 27, returned as such by M. Tournier, is *O. affinis* of Sharp's Cat. 1872.

36. *O. helveticus* (Tournier MSS.).—L. C. Rye, Mag. xii 177, returned as such by M. Tournier. Caterham, G. C. Champion. *One specimen.* 1876.

37. *Meligethes ochropus*, *Sturm.*—E. C. Rye, Mag. ix 156, and An., 1873, 28. New Forest and Esher, J. A. Power and E. C. Rye. 1872.

38. *M. incanus*, *Sturm.*—E. C. Rye, Mag. viii 286, and An., 1873, 28. Darenth, G. R. Waterhouse. *One specimen.* 1872.

M. mutabilis, Rosen.—E. C. Rye, Mag. viii 269, according to M. Brisout, = *pictus*, *Rye.* 1872.

‡ 39. *Silvanus advena*, *Er.*—An., 1874, 88, was introduced in former lists, but afterwards omitted; should be restored, but is certainly only naturalised. 1874.

40. *Cryptophagus subfumatus*, Ktz.—E. C. Rye, Mag. xii 178. G. C. Champion. *One specimen.* 1876.

41. *Atomaria divisa*, *Rye*.—E. C. Rye, *Mag.* xii 178. E. C. Rye's collection, no locality. *One specimen.* 1876.

42. *Parnus striatellus*, *Fair.*—G. Lewis, *Mag.* xiv 70, returned as such by M. Kiesenwetter. Norwich and Horsell, J. A. Power. 1877.

Geotrupes stercorarius, L.—An., 1874, 93, = *G. putridarius* of Erichson and Sharp's Cat. 1874.

G. spiniger, Marsh.—An., 1874, 93, = *mesoleius*, *Thoms.*, = *stercorarius*, *Er.*, and of Sharp's Cat. 1874.

Trachys pumilus, Ill.—G. C. Champion, *Mag.* xii 226, = *T. nanus*, *F.*, of Sharp's Cat. 1876.

43. *Cardiophorus rufipes*, *Fourc.*—G. C. Champion, *Mag.* xiii 227. Renfrewshire, Mr. Dunsinore. *One specimen.* 1877.

Cyphon pallidiventris, *Thoms.*—D. Sharp, *Mag.* ix 154, = female *C. nitidulus*, *Thoms.* 1872.

C. punctipennis, Sharp.—D. Sharp, *Mag.* ix 155, and An., 1873, 29, = *C. nigriceps* of Sharp's Cat., and of An., 1872, 181. Erected into a new species. 1872.

‡ 44. *Ptinus testaceus*, *Ol.*—D. Sharp, *Mag.* ix 268, and An., 1874, 97, no doubt introduced. 1873.

‡ 45. *Tribolium confusum*, *Duv.*—D. Sharp, *Mag.* ix 268, and An., 1874, 98, no doubt introduced. 1873.

46. *Abdera triguttata*, *Gyll.*—G. C. Champion, *Mag.* xi 63. Aviemore, G. C. Champion. 1874.

Anthicus Scoticus, *Rye*.—E. C. Rye, *Mag.* ix 10, and An., 1873, 29, is the *Anthicus* determined by E. C. Rye as *A. flavipes*, *Panz.* An., 1868, 1870, and 1872, 185, but now made a new species. Loch Leven, J. A. Power and E. Waterhouse. 1872.

Melœ cyaneus, *Muls.*—E. C. Rye, *Mag.* viii 248, 288, also An., 1873, 30, is probably *M. proscarabæus*, *var.* 1872.

Otiorhynchus blandus, *Schön.*—D. Sharp, *Mag.* ix 290, and An., 1874, 100, is *O. monticola* of Sharp's Cat. 1873.

47. *Cathormiocerus maritimus* (*Moncreaff* MSS.).—E. C. Rye, *Mag.* x 176, is *Cathormiocerus* spec., *Rye*, An., 1871, 21. 1874.

48. *Liosomus troglodytes*, *Rye*.—E. C. Rye, *Mag.* x 136, and An., 1874, 103. Faversham, J. Walker. *Two specimens.* 1873.

49. *L. oblongulus*, *Boh.*—E. C. Rye, *Mag.* ix 242, and x 138; also An., 1874, 102. Chatham and Caterham, J. Walker and G. C. Champion. 1873.

50. *Bagous brevis*, *Gyll.*—E. C. Rye, *Mag.* ix 242, and An., 1874, 103. Horsell, J. A. Power. 1873.

51. *Smicromyx Reichei*, *Gyll.*—E. C. Rye, *Mag.* ix 11, and *An.*, 1873, 30. Folkestone, E. Waterhouse, *Two specimens.* 1872.

52. *Orchestes semirufus*, *Gyll.*—E. C. Rye, *Mag.* x 18, and *An.*, 1874, 105. Stated in *An.*, 1872, 189, to be erroneously inserted in British list. Weybridge, S. Stevens. 1873.

53. *Nanophyes gracilis*, *Redt.*—E. C. Rye, *Mag.* ix 157, and *An.*, 1873, 31, = *N. geniculatus*, *Aub.* Esher, New Forest, Horsell, E. C. Rye, G. C. Champion, J. A. Power. 1872.

Cossonus ferrugineus, *Clair.*—T. V. Wollaston, *Mag.* ix 243, and *An.*, 1874, 109, is *C. linearis*, *L.*, of Sharp's *Cat.* 1873.

54. *Apion opeticum*, *Bach.*—E. C. Rye, *Mag.* xi 156. Hastings, J. A. Power. *Two specimens, male and female.* 1874.

Bruchus atomarius, *L.*, Thoms.—Rev. H. Gorham, *Mag.* ix 191, and *An.*, 1874, 110, is *B. seminarius* of Sharp's *Cat.* 1873.

B. lathyri, Kirby.—E. C. Rye, *An.*, 1874, 110, and *Mag.* ix 191, is *B. loti* of Sharp's *Cat.* = *B. oxytropis*, *Geble?* 1873.

* 55. *Clytus erythrocephalus*, *Fab.*—E. C. Rye, *Mag.* ix 215, 268, also *An.*, 1874, 112. Middleton, Mr. Thorpe. *One specimen*, certainly accidental. American. 1873.

* 56. *Agapanthia micans*, *Panz.*—E. C. Rye, *Mag.* ix 190, and *An.*, 1872, 112, in E. C. Rye's collection. *One specimen.* No history. Probably accidental. 1873.

57. *Pachyta sexmaculata*, *Lin.*—G. C. Champion, *Mag.* xiv 92. Aviemore, Mrs. King. *Two specimens.* 1877.

58. *Thyamis distinguenda*, *Rye.*—E. C. Rye, *Mag.* ix 157. Mickleham and Boxhill, E. C. Rye and G. C. Champion. 1872.

Psylliodes instabilis, *Foud.*—E. C. Rye, *Mag.* xii 180, probably is *P. picipes* of Waterh. *Cat.*, and *An. List*, 1872, 200, and *An.*, 1873, 33. Corroborated by M. Allard. 1876.

59. *Scymnus arcuatus*, *Rossi.*—T. V. Wollaston, *Mag.* ix 117. Shenton, T. V. Wollaston. *One specimen.* 1872.

In making out this list I have searched through the 'Entomologist's Monthly Magazine,' the 'Entomologist's Annual,' the 'Entomologist,' the 'Scottish Naturalist,' and the Transactions of the Entomological Society of the last six

years, and thus obtain eighty-three notices. Of these, twenty-four are changes, or corrections, of names which were previously in our catalogues; and fifty-nine refer to insects absolutely new to our list. Of these, however, two ought to be excluded, as referring to merely single specimens of undoubtedly American insects, viz., *Leistotrophus cingulatus* and *Clytus erythrocephalus*; and two others, as relating to single specimens of insects known as foreigners, but without any trustworthy British history, viz., *Platysoma oblongum* and *Agapanthia micans*. Again, three others are undoubtedly to be considered as merely introduced, and scarcely naturalised, and as having no claim to be supposed British insects proper, viz., *Silvanus advena*, *Plinus testaceus*, and *Tribolium confusum*. We have, thus, fifty-two for the absolute number of genuine additions in six years, and it is not improbable that a few of these will be ultimately reduced; new species having in several cases been founded on single specimens, or by the separation of insects which had been previously grouped under one name; the differences being occasionally not of a very decided character, and some of them possibly merely sexual. Thus two species of *Trimium* have been reduced into one, as representing only the sexes; and *Meligethes palmatus*, Er., is identical with *M. obscurus*, Er., on the same grounds. We thus obtain an average of not quite nine, for each of the last six years; a great contrast to that of fifty-five, as recorded for the previous seventeen years, in the list of the 'Entomologist's Annual' of 1872. This would seem to indicate either that the new species are becoming pretty well worked out, or that there has been a great lull in collecting activity, which I suspect is the case.

The only name which stands out prominently is that of that indefatigable collector Mr. Champion, assisted by his friend Mr. Walker; Mr. Lawson has done much. Mr. Crotch and old Turner are, alas, lost to us; Dr. Sharp and Mr. Gorham have ceased to give much exclusive attention to British insects; Mr. Rye has now little or no time for personal collecting. All of these are men who used to add largely to our discoveries, and they have not yet been replaced.

If we analyse our Catalogues we shall find that in

1872	there were	18	new insects,	and	9	changes of name.
1873	"	13	"		7	"
1874	"	5	"		2	"
1875	"	4	"		0	"
1876	"	15	"		6	"
1877	"	4	"		0	"

It would seem then, that there have been slight outbursts of British energy in the years 1872, 1873, and 1876; but during the last year a state of almost absolute stagnation.

There must be a wide field of discovery yet open in Ireland, the northern parts of Scotland, and even in Wales, which are almost unexplored in comparison with the more populous districts of England; and let us hope that at the end of another six years we shall have to record a revival of entomological ardour, and a large increase in our averages. It will be observed that the determinations have been made principally by Mr. Rye or Dr. Sharp, whose critical acumen, and extensive entomological knowledge and experience, has rendered them the almost universal referees of less accomplished British coleopterists, or of those who have not access to the books, &c., necessary for identifying the novelties which they recognise as the result of their collecting.

52, Burton Crescent, January, 1878.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LEUCOPHASIA SINAPIS AT REST.—With reference to *Leucophasia sinapis* the late Mr. Newman used to say that it had never been observed at rest. On the 5th of August, in Stubby Copse, I touched with a stick what I thought to be a bleached specimen of *Pseudopterpna cytisaria* at rest on some stunted grasses in one of the ridings. It turned out to be rather a dull specimen of *L. sinapis*, resting with the wings brought down to the sides, in this respect resembling no other butterfly with which I am acquainted.—H. WHITTLE; 20, Cambridge Terrace, Lupus Street, S.W., Feb. 12, 1878.

ACRONYCTA MYRICÆ.—Guenée described *Montivaga* as a variety of *Acronycta euphorbiæ*, and *A. myricæ* as a distinct species, and my specimens so far agree with him that my *Montivaga* are all lighter than *A. myricæ*; nevertheless it has long been supposed that *A. myricæ* is merely the dark insular form of *A. euphorbiæ*, and Dr. Staudinger has already noted the supposition in his Cat. Lep. Europ. of 1871; but he does not even yet say that the identity has been proved by breeding; and until this is done it must, in such a family as the *Acronyctidæ*, remain matter of doubt.—N. F. DOBREE; Beverley, February 4, 1878.

ZYGÆNA FILIPENDULÆ DOUBLE-BROODED.—Having never before met with a second brood of *Zygæna filipendulæ* in this country, I think it may be worth recording that I took

four specimens of this insect on the 26th of September last, on the hills near Reigate. They were all perfectly fresh, and sitting on the blades of grass, upon which hung the pupa-cases from which they had just emerged. These specimens are very much smaller than those of the summer brood, and the spots show a tendency to coalesce, as in *Z. trifolii*. Besides the specimens captured I saw another pair *in coitu*.—HENRY CHARLES LANG; Thurlow Lodge, Golden Manor, Hanwell, W., January 21, 1878.

DICYCLA OO, &c., ON WIMBLEDON COMMON.—Of this generally considered local insect I took a very fine specimen at sugar, on the 4th of July last year. On the same night I took about twenty *Dipterygia pinastri*. This was the only really good night's sugaring I had during the season. Amongst other noteworthy captures made at the same place during the year I may mention *Grapholita minutana* (about a dozen nice specimens), *Pædisca oppressana*, and *P. ophthalmicana*.—H. WHITTLE; 20, Cambridge Terrace, Lupus Street, S.W., February 12, 1878.

CAMPTOGRAMMA FLUVIATA.—I first took this species near Battle, flying along a ditch under a hedge at dusk. My brother also captured one in exactly the same way the next night; this was the end of August. The next was captured by means of a lantern upon heather, at Rake, a village four miles from Petersfield, on September 10th: this was a black female, with a very distinct reddish band (var. *Gemmaria*). I again met with it at St. Leonard's, on October 21st, in a damp ditch amongst willow.—E. K. ROBINSON; Quebec House, St. Leonard's, October 19, 1877.

EPHIPPIPHORA RAVULANA.—Last June I met with four examples of this rare species in Tilgate Forest. *Eupæcilia ambiguana* appears to have quite disappeared from the copse where I found it some ten years ago.—E. G. MEEK; 56, Brompton Road, S.W.

EUPÆCILIA CURVISTRIGANA.—While staying at Folkestone last August I captured a very fine series of this beautiful species. I had not seen it alive since 1866, when I met with a couple of specimens in a wood in North Devon. It may be imagined how pleased I was to find my old friend in a new locality.—ID.

CAPTURES IN IRELAND IN 1877.—My first visit to the willows was on the 2nd of April, when I took a specimen each of *Trachea piniperda* and *Tæniocampa miniosa*. Subsequent search for these insects resulted in the capture of

nineteen *T. miniosa* and twelve *T. piniperda*. On the 5th of July I took from a spider's-web a fine female *Lithosia quadra*; it was then alive. So far as I am aware this is the first Irish record of these three species.—W. TALBOT; Ashford, Co. Wicklow.

THE BRITISH HEMIPTERA-HOMOPTERA.—I must quarrel with my friend Douglas's expression, "deterrent remarks," as applied to what I said in my observations upon the *Homoptera* in the little list which I gave of Irish insects in the January number of the 'Entomologist.' I intended to be anything but "deterrent," and hoped, on the contrary, by what I said to incite a large number of collectors to work at this most interesting, but neglected, group, by showing that in it there is a much more extensive field open to new discoveries than in any other. Assuming that there are one hundred workers at *Coleoptera* I doubt whether there would be twenty who attack the *Hemiptera* and *five* who *touch* the *Homoptera*, exquisitely beautiful and interesting as they are. The field of discovery must, therefore, be very great, and a large number of indigenous species must be yet unknown; and indeed every year many new ones are added, far more than in other groups. I did not mean to say that either catalogues or descriptions of *Homoptera* are *wanting*, as far as we can go; but I do think that in the present state of our knowledge any catalogue of a year ago must be even now unsatisfactory, and that its authoritative publication would be premature. It is certainly true that first catalogues can never stand, and soon become obsolete after the additional investigation which they excite, *vide* the changes introduced by Messrs. Crotch and Sharp upon Mr. Waterhouse's Catalogue of *Coleoptera*, which was a grand work of its kind, and a splendid pioneer; *vide* also the original Catalogues of *Hemiptera* of Messrs. Scott and Douglas, as revised by Mr. E. Saunders, and indeed themselves. As to descriptions of the *Homoptera* those of the species known up to the period alluded to may certainly be worked out from the various numbers of the Ent. Mo. Mag., Entomological Society's Transactions, and from the publications of the Ray Society, emanating chiefly from Messrs. Douglas and Scott, and partly from Mr. Marshall; but to these three have been continual additions; and I do not think that we homopterists shall be satisfied until we get them all put together in a new Douglas and Scott volume, which I hope will by-and-by appear under the auspices of the Ray

Society. And I do sincerely trust that, in working up this favourite group of mine, they will obtain large additional assistance from all quarters, which must bring in a great number of new species, without anyone being "deterred" by my remarks.—JOHN A. POWER; 52, Burton Crescent, February 13. 1878.

INJURIOUS INSECTS.—We are glad to be enabled to state that the plan of recording observations relative to the best means of counteracting the attacks of injurious insects, to which attention was drawn in a pamphlet published in June last (see "Practical Entomology," Entom. x. 166), has been acted on far more successfully than could have been hoped for on a first trial. Practical observers, both in England and Scotland, have come forward, and some useful information has already been gained. This is embodied in a Report recently published for the observers, which, at the request of the promoters of the plan, will be furnished gratuitously to applicants (with sheets for entry of observations, and the original pamphlet of notes for points to be observed) by Mr. T. P. Newman, 32, Botolph Lane, Eastcheap, E.C. Assistance has already been promised for the coming season; and any observations which may be kindly furnished by practical entomologists and agriculturists will be a valuable aid, and gratefully received for incorporation in the next Report.—ED.

NATIONAL ENTOMOLOGICAL EXHIBITION.—We would draw our readers' attention to the Exhibition which will open on Saturday, March 9th, at the Royal Aquarium, Westminster. The applications for space already received far exceed the most sanguine expectations. All orders of insects will be represented in collections varying in size from one insect to sixty cabinet drawers. This, the first general entomological exhibition ever held, will afford a good opportunity for students to compare notes and extend their knowledge. The fauna of almost every part of the United Kingdom will be represented, typical collections having been entered from remote districts. The last day for receiving applications for exhibition space will be Thursday, March 7th; so we would urge intending exhibitors to lose no time.—ED.

THE DOUBLEDAY COLLECTION.—This valuable collection of *Lepidoptera*, still deposited at the Bethnal Green Museum, was specially consulted by 1492 visitors during 1877.—ED.

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[No. 179.]

OBSERVATIONS ON A VARIETY OF CHELONIA VILICA.

By H. Goss, F.L.S., F.Z.S., &c.



VARIETY OF CHELONIA VILICA (female).

THE specimen of *Chelonia vilica* figured above was bred by Mr. Ambrose Gates, of Brighton, in the spring of 1872. The peculiarities of the insect are so accurately represented in the figure that their description is almost superfluous. In the fore wings the majority of the usual cream-coloured spots are suffused with black, and others are totally obliterated; no trace of them can be detected, even when the insect is held up to a strong light. As shown in the woodcut, the suffusion or obliteration of the cream-coloured spots on the *right* fore wing is much more complete than in the left fore wing; and, with the exception of the basal spot nearest the costa and three minute spots near the tip, not the slightest trace of cream-colour is to be found in it. In the *left* wing, in addition to both the basal spots and three small spots near the tip, there is a large spot between the centre of the wing and the costa, a small cuneiform spot between that last mentioned and the inner margin, and some slight traces of the large spot which in ordinary specimens of this species is situated near the anal angle. In the hind wings the only peculiarity is the confluence of certain spots near the centre, so as to form a black streak, extending

completely across the wings. This last-mentioned variation is, however, not uncommon; and I possess several specimens of *C. villica* with a similar streak in the hind wings.

It is difficult to offer any reasonable conjecture as to what may have been the "exciting cause," as Dr. Buchanan White terms it (*Ent. Mo. Mag.* xiii. 148), of such an aberration as the above from the ordinary form of the species. The larva which produced this specimen was obtained, with several dozen other larvæ of the same species, from one locality, near Brighton, and was fed up with them, on the same food-plants, in one breeding-cage. It was, therefore, subjected to the same conditions as to nutriment, light, humidity, and temperature, as the others, not one of which, however, produced any noticeable aberration from the type of the species.

Having regard to these facts, I am inclined to think that the colorational peculiarities of this specimen must be considered as the result of a diseased condition of its larva; they cannot be attributed to causes similar to those* constantly operating in certain districts, in the production of melanic or melanochoic forms; nor to any special conditions of food, light, or temperature, to which, in any locality, a larva in a state of nature may, under peculiar circumstances, be subjected.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. VII. NYMPHALIDÆ—ACRÆINÆ.

THE *Acræinæ* are a rather small group of long-winged butterflies, generally of some shade of fulvous, with black spots, or black, with white or yellowish markings, and the hind wings beneath either striated, or spotted with black at the base. The fore wings are partially transparent in some species. The palpi of the imago are thick and scantily clothed with hair, and the larvæ are spiny. The genus *Acræa*, as it stands, is too extensive, but it cannot yet be satisfactorily subdivided, though we may retain the name *Actinote*, Hübn., for the South American section, with

* *I. e.*, the geological formation of a district, and the nature of its mineral productions (if any); its geographical position, and the prevailing character of its climate and vegetation.—H. G.

striated hind wings, and *Alæna*, Boisd., for the smallest of the African species.

The typical genus, *Acræa*, Fabr., is exclusively African, if we except a very few Indo- and Austro-Malayan species. In the first section, to which belongs *A. Horta*, Linn., the type of the genus, the fore wings are more or less transparent, and the hind wings and base of the fore wings are of some yellowish or reddish shade, varying from pale tawny to red, with numerous black spots, or a macular band. In some species the hind wings are creamy white, as in the Australian *A. Andromacha*, Fabr., which has some resemblance to *Eurycus Cressida*, an insect allied to *Parnassius*, and likewise a native of Australia.

The next section contains a great number of closely-allied species or varieties of considerable size, none measuring less than two inches across, and some nearly four. They are dark brown, with the veins of the hind wings strongly marked. The fore wings are banded or spotted with red, white, or pale yellow; and the hind wings have a band of the same colour, which is often broad enough to cover almost the whole of the wing. *A. Euryta*, Linn., may be considered the type of this group.

In the next group, comprising *A. Zetes*, L., and its allies, the wings are smoky black, with very large spots both above and below, and the fore wings are slightly transparent, often with a short whitish or yellowish transverse band near the tip. The males have a submarginal reddish band, varying in breadth, on the hind wings.

The next group (*Telchinia*) comprises the bulk of the smaller species, measuring from one inch and a half to two inches and a half across; and many of them have a superficial resemblance to Fritillaries. They are generally reddish or tawny, with numerous black spots or dots, and the borders are black, often spotted with yellow on the hind wings. In some species, as in *A. Serena* and *Eponina*, Cram., the tip of the fore wings is more or less broadly black, with a transverse whitish or tawny stripe; and in the latter the base of the hind wings and part of the inner margin of the fore wings is also black. One species of this group, *A. Violæ*, F., is common in Northern India; the others are African.

The next group (*Pareba*) only includes one North Indian species, *A. Vesta*, Fabr. It is a long-winged, yellowish tawny insect, with dark borders spotted with yellow. In the female the veins are strongly marked, and the tawny portion

of the fore wings is broken into spots by the veins, and by transverse dusky markings. There are no black spots at the base.

The genus *Alæna* only comprises two little species from Central and Southern Africa, which do not expand much more than an inch at the outside. *A. Amazoula*, Boisd., from Natal, is taken flying among long grass, like a skipper, which it also resembles in coloration, being brown, with a row of elongated tawny spots on the hind margins, and longer ones running from the bases and inner margins of the wings; the under side is more uniformly yellowish, paler, and divided by the nervures, but there are no black spots.

The South American genus *Actinote*, which is likewise destitute of basal spots, and in which the hind wings are always very distinctly striated, at least on the under surface, may be divided into two groups. In the first, represented by *A. Thalia*, L., the fore wings are brown, tawny, yellowish, or reddish at the base and inner margin, more or less divided into spots by the veins, and with a transverse paler band near the tip; the hind wings are of the same colour as the base of the fore wings, divided by the nervures, and often by intermediate black lines, with a rather broad, black hind margin. *A. Thalia*, being apparently a protected species, is mimicked by several other *Lepidoptera*, among which is a *Dismorphia* (*Pierinæ*) and a *Castnia* (a moth). In the second group the wings are bluish black, and the hind wings are unspotted above, though with short diverging yellow streaks at the base beneath in several species; the fore wings have the centre of the wings pink or red, the colour generally extending to the base, and there is sometimes a transverse band of the same colour beyond the red portion. In *A. Neleus*, Latr., the red basal portion of the other species is replaced with a shade of blue, rather paler than the ground colour, but, on the other hand, the abdomen is reddish. In *A. Leucomelas*, Bates, the fore wings are bluish black, with two or three long yellowish streaks placed obliquely at the extremity of the cell.

NOTES ON ARCTIA LUBRICIPEDA.*

By EDWIN BIRCHALL, F.L.S.

THE larva occurs in great profusion in the Isle of Man, but I have met with comparatively few of the perfect insect; and in order to learn whether this scarcity was real or only

* Read before the Lancashire and Cheshire Entomological Society.

apparent I captured 500 nearly full-grown larvæ in August, 1867. It would have been easy to have taken 1000.

There are two varieties of the caterpillar: one whitish, with gray hairs; the other yellowish, with red-brown hairs, sometimes so red as to remind one of the caterpillar of *Arctia fuliginosa*. The gray variety occurs in the proportion of four to one of the red. The colour does not indicate sexual distinction.

Larvæ captured, 500. Moths bred—perfect 106, crippled 20 (males 70, females 56); died in larva state, some partially changed to pupa, 90; died in pupa, 84; produced *Tachina cæsia*, 164; produced small ichneumon, 2; unaccounted for (escaped, or possibly thrown out with old food), 34 = 500.

If it may be assumed that no increase in the number of the perfect insect takes place under ordinary circumstances from year to year in a given locality, my 126 moths must be the final produce of a similar number of moths of the previous year, say 60 of each sex; and as each female of *Arctia lubricipeda* lays on the average 150 eggs (as was the case where I counted half a dozen lots), it will result that, of the 9000 larvæ produced by the 60 female moths of 1876, only 500, or $5\frac{1}{2}$ per cent., became full-grown caterpillars, and 106, little over 1 per cent., perfect moths, leaving, if we count the cripples, the enormous number of 8874 larvæ, or 99 per cent., to have perished at various stages of growth. Terrible as it seems this is no exceptional case; the vast over-production and early destruction of life is the rule throughout Creation: life seems to be the most worthless thing which God makes, if we may judge from the base uses to which it is put. Proud man himself is no exception to the universal laws, though he may mitigate its force. Of 800,000 children born every year in Great Britain, 120,000 die in the first year; and in London one-fourth of all children born die before they are a month old. (See Sir Charles Lyell's 'Antiquity of Man,' p. 503.)

This, although awful to contemplate, is no doubt a much smaller rate of mortality than in the case of *Lubricipeda*; but man has not yet reached the point where his increase is checked by the impossibility of finding food or unoccupied space. His time will doubtless come; but so far as present experience goes the process of thinning his race by overcrowding or starvation is not a promising one, either for the improvement of the breed or the evolution of a higher form, although it may be dignified by the name of Natural Selection.

It is difficult to specify the causes of the heavy mortality amongst larvæ, especially in the case of *Lubricipeda*, which appears to be a protected species, and has thus become one of our most abundant and widely-distributed moths. Being polyphagous it can rarely suffer from want of food. When young they feed in companies; and both the eggs and the young broods are probably swallowed wholesale by browsing animals. Nature seems to think it no waste to sacrifice a thousand of their lives to feed a donkey; possibly the young caterpillars give a relish to his dock-leaf.

I do not know whether small birds dislike the young larvæ, but when fully grown it is, with other hairy caterpillars, distasteful to many birds, and seems to walk the paths and climb the walls unmolested. Whether the dislike of these caterpillars evinced by birds is owing to some disagreeable taste or smell, or to their hairy coats, seems doubtful. When thrown to domestic fowls I notice that in the first rush to secure a share of what they probably think is a distribution of ordinary food, the young birds will generally swallow a few; but as soon as the excitement is over, and they take time for a preliminary peck, young and old alike refuse them. There does not appear to be any mechanical difficulty in swallowing the hairy caterpillar, but it is difficult to connect the sense of taste with the horny bill of a bird.

I timed the speed of locomotion in many of these larvæ, and upon a table covered with woollen cloth found it to be about three yards per minute. Why they are in such a hurry is puzzling, seeing that birds will not touch them, and their insect foes have no need to hunt them, as they feed openly, and are always to be had at dinner-time when wanted. There is a curious and, may I not say, singularly human aspect in the contrast between the hurrying caterpillar on the foot-way, and its stupid, gluttonous habit as soon as it finds its food. The activity of a lepidopterous insect seems to be often concentrated in one period of its existence: the agile soaring butterfly is developed from the most sluggish of larvæ; the torpid *Arctiæ* from very race-horses of caterpillars. The great excess of dipterous parasites is a noticeable fact, the proportion being as 82 to 1 hymenopterous.

I have often seen the large black *Tachina casia* to all appearance idly sunning itself on the nettles and docks where I found *Lubricipeda*, without a suspicion of its motives; and it is a useful lesson to learn from day to day how much is going on around us, before our very eyes, to

which we are blind; what tragedies are incessantly acting in every bunch of nettles, almost under every grain of sand. In no case did I find more than one parasite in a larva.

The moth, I need hardly say, is variable in the size and disposition of the dark spots on its wings; but out of my 126 specimens not one presented any very striking variation from the ordinary type. As the struggle for life must be desperate, when only 1 in 75 can win, and the issue must hang on very minute and seemingly unimportant circumstances, I conclude that the colours of the moth do not in this case count for much in the race.

I incline, however, to think that the red caterpillar is in some way weaker, or more exposed to attack, than the gray form; not only are the gray caterpillars much more numerous, but the proportion of moths produced by the red variety is much smaller.

Douglas, Isle of Man, December 25, 1877.

ENTOMOLOGICAL RAMBLES, 1877.

By J. B. HODGKINSON.

(Continued from p. 31.)

JULY.

THIS should have been the great Tortrix month, but I had poor hopes of much luck, seeing that there were so few larvæ in June. Still I rambled away as usual, thinking that if there were no moths I could add to my stock of health, which, however, did not require mending; so off I set to Grange the first week to get some *Euchromia rufana*, but, like everything else, not one would stir. I paid several visits, but to no purpose: cold and wet weather still continued; always an umbrella; and trying to find some sheltered place in one of the walks through the wood I took *Sericoris bifasciana* off a Scotch fir, and odd specimens of *Ephippiphora signatana*, as well as *Argyresthia mendicella* from the sloe; in fact I had to make up a bag with almost anything to keep my setting-boards full. Then I turned to the wild cherry tree, and took a lot of *Argyresthia ephippella*, and among the agrimony I found a few larvæ of *Nepticula æneofasciella*, but only reared one of the second brood. There is something singular about the second broods of both *Nepticula* and *Lithocolletis*, so very few come out in proportion to those that are in pupa all winter. The second week again off to

Witherslack, expecting to take *Eupæcilia Manniana* and *Tinea albipunctella*, but as usual I spent several days, and nights too, without success. The best time for many *Eupæciliæ* is, I may say, just after dark, but we were often starved out and disgusted with promenading the spot over and over again without result; an odd *Macaria alternata* and *Emmelesia alchemillata* were the only *Geometræ* worth catching; yes, there was an April species out, viz., *Cidaria suffumata*. Next, Mr. Threlfall and I agreed to try for *Elachista serricornella* on the moss, the usual time being about the 12th: here, again, nothing stirring; one or two *E. rhynchospora*, which should have been in hundreds. We spent during the month several days and nights, at all hours, trying for *E. serricornella*. Mr. Threlfall got up one morning at four o'clock to see if there was anything so early on the moss: his report was more *Carsia imbutaria*, *Hyria auroraria*, *Mixodia Schulziana*, &c., flying about than during the day or evening. However, even this catch was neutralised by the heavy dew, for he came back to breakfast wet through above the knees, and his net became useless after a stroke or two; so this new effort had to be given up. On some odd days we got a bit of sweeping done, and got *Adela minimellus*, *Gelechia atrella*, *G. similella*, *G. tæniolella*, and *Coleophora Fabriciella*, this species always among the trefoil, still the larva is unknown; and I know always to a yard where the moth occurs, but cannot yet find it. During the last week I only took three *Elachista serricornella*, but Mr. Threlfall had better luck than I had. Of *Schrankia turfosalis* I could only find an odd one now and then, when my usual catch is one a minute, until I am satisfied. We filled up our time by looking for larvæ of *Depressariæ* on *Pimpinella saxifraga*, and a weary job it was, especially finding *Depressaria capreolella* larvæ; those of *Pimpinella* are easier to find. Several visits to the rocks after *Sciaphila Penziana* only yielded one; in fact, the wind on some occasions was blowing a gale, and in all directions; a sheltered corner was not to be found. During this month I had made up my mind under any circumstances to work out the life-history of *Emmelesia tæniata*; here again I was out of my reckoning. I visited Arnside, Grange, Witherslack, and Windermere, all localities for this species, and only took two and a half specimens; the half specimen had only two wings, but proving a female she obligingly laid fifteen eggs. I sent them on to Mr.

Buckler. Several hatched, and nibbled away at the enchanter's nightshade, a plant that we have both set down as its probable food. I suggested besides some of the *Hypericums*, as I could see no other likely plants where they occur. The young larvæ seemed to take well to this change. They lived to a certain age, and then died. This is the result of over one thousand miles pilgrimage by rail and legs. However, the latter are not done yet, and I hope to give a better account of *Taniata* next July.

During the month I paid a visit to my tansy bed to see if some larvæ of *Pterophorus dichrodactylus* had settled down to their new quarters. Mr. Sang kindly sent me some for that purpose. Judge of my mortification when I reached the garden to find a herb gatherer had been and cut them all down; he had given a man in the garden sixpence to do so, whereas I was farming the bed at five shillings per annum. I went after the plants, and found the larvæ letting themselves down from the ceiling. As the tansy had got dried up I had then to fall back on my Michaelmas daisy for a supply of *Dicrorampha tanacetana*; and among the roses in the same garden I got a nice lot of *Spilonota rosæcolana*, the only place I find them down here. Now to Windermere, from the 12th to the 30th, I went about half a dozen times, chiefly to look for *Cidaria reticulata*; and one day it never ceased blowing and raining from morning till night,—a sad blank to four of my children; we could never leave the railway station. Another day it was blowing a furious gale from the north, and I had sent word for a man to come for me with a boat from the other side, near Wray Castle. He had to pull up a long way against the wind to meet me at my place; but the next thing was to get back, which we found utterly impossible, and had to go with the wind, and dodge across at a narrow place from island to island. Then we had to beach the boat and leave it; and I had to walk a long journey before getting to my hunting ground; and as usual the only moths I got were two *Cidaria prunata*. I always take this species when looking for *Reticulata*, but did not see a single specimen of the latter, only those I bred. In fact, I should say it is the most wretched place for moths of any sort. The woods are dense and gloomy, and there are no birds, only an odd jay screeching out now and again. Formerly I used to take *Cidaria olivata* in abundance; of *Tineæ* there are next to none. The best collecting woods are all on the way to Ambleside, close to the station. I heard and saw

many pheasants on the other side of the lake, which rather disturbed the ideas of liberty I had so long enjoyed, never meeting anyone. However, on looking up I saw notices on the trees:—"Trespassers, either nutting or otherwise, will be prosecuted." I soon ascertained there were gamekeepers and watchers, whose acquaintance I had not yet made.

Preston, February, 1878.

(To be continued.)

CONSIDERATIONS ON ABNORMAL GALL-GROWTH.

By E. A. ORMEROD, F.M.S.

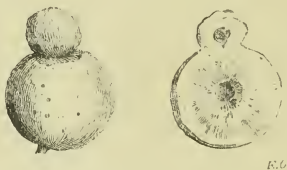


Fig. 1.—*CYNIPS KOLLARI*.

THE cause of gall-growth, that is the exact method by which insect oviposition or larval presence causes this peculiar development, is still so far from having been ascertained that any completely abnormal form is of interest, as possibly throwing light on the physiological points involved; and the singular specimen figured above, showing one gall of *Cynips Kollari* formed on the apex of another, differs so completely from any known recorded state of this gall as to be worth notice. This, it will be seen, has no relation to the common double form of *Kollari* galls, in which two, starting growth in juxtaposition, unite by their contiguous sides, but consists of two galls of different dates of growth, and completely distinct (save at the origin of the super-imposed one) from each other. This interesting specimen was found growing near Maldon, by Mr. Fitch, who was good enough to forward it to me for examination.

When gathered the lower of the two galls was mature, hard, and brown, whilst the upper one (then as large as the older one from which it originated) was still young, green, and succulent; this difference in age being still further

shown by the lower and matured gall remaining in its firm condition after being gathered, and the other one shrivelling and contracting, as shown in the figure, the kind of furrow round its base indicating the extent to which the soft tissues have drawn in. A longitudinal section shows each gall to possess a central larval chamber, the internal structure only differing in the parenchyma (or merenchyma) surrounding the harder substance of the cell-wall, which is in its usual state in the lower gall, being shrivelled into a hard mass in the upper one, with the central cell still undeveloped in consequence of its immature state when gathered. What causes may have operated to give rise to this secondary growth it is difficult to conjecture. The presence of the larval cell shows the true gall nature of the growth, and that it is not a simple vegetable excrescence; but the great difficulty lies in the botanical point as to why the parenchymatous tissue should in this case have had the power of throwing out a growth from itself under *Cynips* oviposition, which (if it has occurred before) is at least so unusual as not to have attracted attention.

One explanation (conjecturally) lies in the possible presence of adventitious buds. These, as is well known, may be produced on any part of the normal growths of the tree, and usually where there are stimulating conditions, and an insufficiency of the ordinary buds to carry on the plant action. Should this have occurred nothing further than oviposition would be necessary for the formation of the gall; but the bud presence is very problematical; and a more likely solution suggests itself in abnormal oviposition having taken place in the lowest gall before its formative powers were exhausted, and having caused it to throw out the new growth instead of continuing its own.

It seems to me, however, that in considerations of gall-growth, whether the primary cause lies in injection of fluid, or oval or larval irritation, there is a twofold effect of oviposition to be observed; one producing the larval chamber—the gall proper; and (frequently) a secondary one, which usually gives the gall its characteristic form, but which still preserves its vegetable powers and structure in all essential points, and consequently may be modified by circumstances or state of health of the plant.

These distinct formations may be traced through the stage of division in *Andricus curvator*, where the internal capsule may first be found embedded in a solid cellular mass;

then disengaging itself by process of growth, a few fine shreds of tissue being noticeable drawn across the forming cavity, from the outside of the capsule to the inside of



Fig. 2.—ANDRICUS CURVATOR.

the containing hollow chamber, and then separated, this being completely effected in the case noted in about five days (from May 11th to May 16th).

Looking at *Cynips* galls of the oak (as most easily traceable) it appears that one species of *Cynips* causes one special kind of gall, whether the oviposition is on different parts of the tree, or whether several species deposit together in precisely coinciding position and circumstances. We see an example of the former in the well-known currant-gall, formed by *Spathogaster buccarum*, alike on flower-stalks and on leaves;* and of the latter in some of the bud- and bark-galls of the less-known species of *Aphilothrix*, where it appears plainly shown that it is oviposition, not the part of the tree attacked, that affects the characteristic of the gall. The cells of *Aphilothrix corticis* and *A. radicis* may be found in precisely similar circumstances in young bark; *Andricus quadrilineatus* with those at the base of the gall of *A. ramuli* (the woolly-gall); or again in the case of the artichoke-gall (*Aphilothrix gemmæ*), occurring in the axil of a leaf on a shoot bearing galls of *Cynips Kollari*, and similarly in the axils of the leaves immediately above and below; but with this, although the form of the gall (properly so-called) appears constant, yet there are modifications in what may be called the secondary part.

* Even should the alternation of generation between *Spathogaster buccarum* and *Neuroterus lenticularis*, which Dr. Adler considers to take place, become a proved fact, this would in no way militate against the constant correspondence of the gall and its insect, as under this theory the change of one follows the change of the other.—E. A. O.

We see the two parts (of course only speaking of the species of galls where two parts exist) can carry on life each without the other, and that there is in some cases a chemical difference is shown by galls of *A. radialis* changing colour in the general mass when cut by a steel knife, whilst the section of the cells continues white. In the same species of gall we have the large cellular mass forcing itself rapidly up through the bark from the cambium region beneath, during the flow of sap in the spring, whilst the single-celled form placed in the substance of the young bark simply exists in the shape of detached specimens, this difference no way proving difference in the gall, as may be shown in the cells of the woolly-gall, where some exist single, some double, some in indivisible clusters. In the artichoke-gall we have frequently an abortive form, with the gall-chamber missing, in which the larval action appears to have been interrupted before the formation of the cell, so as only to have given rise to what is botanically an abortive shoot, with its longitudinal growth checked, but the adventitious buds thrown into action in the form of the stunted leaves which compose the scales.



Fig. 3.—ANDRICUS INFLATOR.

In *Andricus inflator* we have the inner chamber containing the gall insect, with a clear illustration of simply modified vegetable action in the surrounding shortened shoot, giving rise to its numerous sprays; and in the specimen, whether we consider the two lower cells those of *A. inflator* or *A. curvator*, we have an example of the gall-chamber existing without its characteristic involucre development, whilst above is a specimen which, when fresh, must have been abnormally swollen even for *A. curvator*, and from which there appears no reason botanically why another gall

should not have sprung. The leaf and petiole in the normal state are capable of throwing out shoots, and in this case there is no apparent change in the general parts of the structure, and if from abnormal stimulus a shoot was thrown out oviposition would give us an abnormal gall, coinciding in many points with the one under consideration of *Cynips Kollari*. However, though this is apparently possible, we have not sufficient knowledge of the structural alterations to admit its probability, and as the very essence of the characteristic of the *Kollari* gall is to lose all trace of its origin in its progress of growth, even should the case have been so, it must rest unproved.

The matter, however, is very interesting as a clue to variations of structure, and some experiments on the results of stimulating or condensing the flow of sap in the early stages of the growth of *Kollari* galls, by ringing, or heading back the shoots, might give us some valuable physiological information.

Judging from experiments with others of the *Cynipidæ*, abnormal oviposition might readily be effected. *Aphilothrix radialis* will oviposit in oak buds in captivity; and on the 13th of December, in the last year, I was fortunate enough to capture two specimens of *Biorhiza aptera* in the very act of ovipositing in the buds of the branches of an old oak at about seven feet from the ground. Being anxious to secure the insects for identification beyond my own examination, I was obliged to draw down the boughs and break off the sprays, but even this did not disturb them, so that in one case I was able to watch the operation for some minutes, and in the other (as I slightly injured the creature in gathering the spray) the ovipositor was just pressed from the bud, with an egg in the act of protrusion. One of the specimens subsequently (as far as could be seen through a fine net) proceeded with oviposition on two buds of an oak in my own garden; and as I have noted the then state of the spray, and isolated it, some curious results may be hoped for.

On examining the buds, amongst which I first found the *Biorhiza* ovipositing, I found one to contain a mass of eggs, similar in their peculiar shape (which is elongated at one end, to a somewhat flask or stalked form), to others which I have taken from the abdomen of *Cynipidæ* on previous occasions. These I have placed, with the bud-scales (which shield them still, though broken from the bud-base), in a small slit made in the bark below the ground level of the same oak in my

garden. At present the outside of the bud is still fresh, and as the contents of the eggs showed indications of the larval presence more than a month ago, I hope that they have progressed so far as to give a prospect of some information as to the effects of larval action on the under-ground bark clearly distinct from those of oviposition.

Dunster Lodge, near Isleworth,
January 24, 1878.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from p. 33.)



Fig. 81.—Galls of *Andricus ramuli*, and a double gall in section.

81. *Andricus ramuli*, Linné (= *Teras amentorum*, Hart.).—This really small, but almost always compound, gall may be found in May on the catkins of *Quercus pedunculata* or *Q. sessiliflora*, but particularly on *Q. pubescens*. Attached to the catkins we often see nut-sized or smaller woolly masses, which have altogether the appearance of white or brownish yellow cotton-wool rolled together in a ball. If we unroll such a ball it falls into several smaller balls, each of which belongs to a single catkin flower. These smaller balls contain a hard uneven lump in the interior, which is about the size and shape of a millet-seed, hard and brown. Ten to twenty of these grow together on a deformed stalk. Each of these small galls is hard, contains a larva-cell, and is covered with numerous very long hairs, originally sappy, but soon drying: these are matted together and twisted in the same

way as the cotton-seed wool. We sometimes find on a fully developed catkin one or more flowers deformed into a small ball, a single gall surrounded with the hairs. In many cases I have bred *A. ramuli* from these; but last year from such galls, which occurred on *Quercus sessiliflora*, I bred in the third week of May a gall-fly which belonged to another species, and differed from it in having a black head and thorax: the abdomen brown above, yellow below; the antennæ yellow at the base, with the first half brown, and with yellow legs. But still further breeding is necessary in order to acquire more knowledge of it. The yellow gall-flies appear towards the end of May and beginning of June.—G. L. MAYR.

I have had more specimens of this "woolly" or "cotton" gall of the oak sent to me to name than of any other species. It is very widely distributed, and generally common in Britain. It has been recorded from five Scotch counties, the most northern of which are Aberdeen and Inverness-shire. From galls collected on 7th June (1875) the first, *A. ramuli*, emerged on the 24th June; and it continued to do so in abundance till the second week in July. The parasites bred by me were *Olynx gallarum*, L., in great abundance: these all emerged the last week in June. Later came two species of *Pteromalus*, and a few specimens of a small green *Callimome*, with the ovipositor slightly shorter than the body. These may be a variety of *C. auratus*, Fonsc., which is mentioned as a parasite of this species in Dr. Mayr's monograph. I also bred several *Dictyopteryx Læstlingiana* from these galls; and Mr. Walker mentions *Anthomyia* (*Homalomyia*) *canicularis* as a dweller in them. Mayr remarks on the scarcity of *Synergi*, and says he only bred three specimens of *S. facialis*, H., and nine of *S. radiatus*, Mayr, although he had hundreds of the galls. I can confirm this, as amongst my numerous stores I do not find a single *Ramuli*-bred *Synergus*. He also bred two specimens of *Ceroptres arator*, H., which emerged at the same time, viz., June of the first year.—E. A. FITCH.

COLLECTED OBSERVATIONS ON BRITISH SAWFLIES.

By the late EDWARD NEWMAN.

(Continued from p. 38.)

PROCEED we now again to divide the *Hexapods* by metamorphosis and wing-character. Having once fully explained

their true structure, in having shown that they are projected and everted wind-pipes, on which a flying membrane is spread, in the same manner as skin on the projected ribs of a flying dragon (*Draco volans*) or sail-cloth on the ribs of a windmill, it will be useless to attempt the substitution of any other term for that of wing.

The beings then of which this paper treats possess an exo-skeleton, or external skeleton, six legs, and either two, four, or six wings, which are subject to metamorphosis, and which arrive at perfection and maturity by one or other of the following methods:—

1. By passing through an amorphous state,—*Amorpha*,—in which the penultimate state (or pupa, or chrysalis) is provided with neither mouth nor organs of locomotion, consequently it neither eats nor moves, nor does it bear any resemblance to the perfect state. We find that the exo-skeleton, after it has been shed for the last time, exhibits some traces of the liberated imago, and that the various portions, or plaits, or cases, are easily separated, and often spontaneously dehised, the dehiscence taking place at perfectly natural fissures. Although the limbs, notwithstanding their change, and the divisions of the trunk are often thus obviously indicated on the exterior surface of the exo-skeleton, the penultimate cannot be said to bear any resemblance to the ultimate state. This class contains two subordinate classes or sub-classes, or as entomologists, with apparently great impropriety, often call them, “orders,” a term which should be used, as it is in places, for associating those animals that possess similar natural characters, and have propensities in common: thus, the *Feræ* amongst sucklers, the *Accipitres* amongst birds, the *Carnivores* amongst *Coleoptera*, and *Mantides* amongst *Orthoptera*, are really natural orders, and precise equivalents one of the other; and each has an aquatic section, also equivalents of each other. This group, then, is divided into two minor groups by the number and clothing of the wings, thus—(A) *Lepidoptera*, in which the imago has four wings, all of them covered with scales. (B) *Diptera*, in which the imago has two wings only, and these are generally naked, but sometimes sparingly covered with hairs, or more or less seldom with scales: in *Diptera* there are also two poisers, which seem the representative of a second pair of wings, but this is only a matter of opinion; I am unable to prove them to be so; they possess, moreover, a pair of winglets, or lobes, one

at the base of each wing; the precise use of these winglets has occasioned some speculation, but this matter also I must leave in doubt. The penultimate or pupa state of *Diptera* is very different in different families; in some it somewhat resembles that of certain *Lepidoptera*; in others it is an oblong object, quite smooth, and looking as though it had been turned in a lathe.

2. By passing through a necromorphous state,—*Necromorpha*,—in which the penultimate state is provided with mouth and organs of locomotion, detached from the trunk throughout their length, but so swathed and enveloped in separate cases that it can employ neither. The resemblance, therefore, to the perfect insect is considerable, except in the want of locomotive power. This group contains two subordinate groups, principally by the character of the fore wings:—(c) *Hymenoptera*, in which the imago has usually four fully developed wings, which are membranous, naked, and without hairs or scales. (d) *Coleoptera*, in which the imago has two fully developed wings—the hind wings, and two wing-cases which cover the wings, and appear to take the place of fore wings: they are invariably called elytra. These are not needed in flying; they are gently raised, some a very little, others to an angle of 45° , and others even more still; but in all cases, when raised at all, they are sufficiently so to allow full play for the hind and only pair of membranous wings. Besides this power of just lifting the elytra, the insect seems entirely unable to move them, and the wings are never seen vibrating as in other insects; indeed they appear to want the systems of muscles necessary for vibration. This want, which is perhaps a most distinctive character of beetles, seems to have been overlooked by entomologists generally, although noticed by the late Mr. Dale in *Stylops*, which is a manifest *Coleopteron*.

3. By passing through an isomorphous state,—*Isomorpha*,—in which all the states are active and voracious, and of similar form to the imago, except in wing. The imago has four wings, all of them more or less coriaceous or leathery, and all more or less available for flight; the fore wings are not merely raised to allow free action of the hind wings, but even these share in the function of flight: this function is, however, scarcely performed with any energy, but is a sort of half-hearted performance, notwithstanding the wonderful migrations some of these insects perform. There are two subdivisions:—(e) *Orthoptera*, having powerful mandibles,

which in eating move horizontally, and even vertically. (F) *Hemiptera*, or bugs, who live by suction, their organ of manduration being so feeble that they have no power to gnaw or bite hard substances. These insects seem under a general ban; their very name is offensive to ears polite.

4. Besides these there is still a fourth primary class,—*Heteromorpha*,—which, from its earliest situation in the World of Insects, possesses some characters of all the rest, as well as some peculiar to itself. These are the *Neuroptera*, which cannot be differentiated by any character common to them all, yet in distinction of the class. Two very different sub-classes are comprised in this heterogeneous group:—(G) *Stegoptera*, which have a necromorphous pupa. (H) *Neuroptera* proper, or dragonflies, which have an active and voracious pupa, yet totally different from that of all other insects. The dragonflies have four *equally* large wings, and hawk for insects on the wing, which they seize and devour.

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

DESCRIPTION OF THE LARVA OF *ACIDALIA INTERJECTARIA*.—At the time Mr. Alfred E. Hudd, of Bristol, sent me the eggs of *Acidalia incanaria* (Entom. xi. 18), he also forwarded a few of *A. interjectaria*. They were globular in shape, and of a pale salmon-colour. On the 3rd of August the young larvæ emerged, and were dark purplish brown; the head black. Until autumn they fed on *Polygonum aviculare*, but after hibernation, on withered dandelion leaves, &c. Only one reached maturity, and it I described on April 18th, as follows:—Length nearly half an inch, stout, and rather stumpy in appearance; the head has the face flat, and is distinctly notched on the crown; it is rather narrower than the 2nd segment. The body has a more uniform appearance than many of the species in the genus, but, like its congeners, the segments gradually widen from the 2nd to the 9th; the next three are of nearly uniform width, but narrower than the 9th, and the 13th is still narrower. Like all others of the genus I have seen the segments overlap each other, rendering the divisions distinct, and each segment is also transversely ribbed, and is clothed with very few, scattered, short, bristly hairs. Ground colour a dirty, dull, smoky brown, marbled and variegated with ochreous-yellow, the darker colour

predominating on the front segments, the ochreous on the 9th to 13th segments. The head is also of these two colours, in about equal proportion. Dorsal line ochreous, deeply edged with smoke-colour; there is a distinct white spot on the posterior part of the 6th, 7th, and 8th segments. There are no perceptible subdorsal lines, but a conspicuous ochreous line extends through the region of the spiracles. The ventral surface is of the same dull, dark, smoky brown as the dorsal area, but has a very pretty series of large, ochreous, crescentic marks throughout its entire length, and there is a very faint indication of a pale central line; the hairs are black. This larva spun a slight cocoon of loose threads; and the imago, a fine female specimen, emerged August 4th.—G. T. PORRITT; Highroyd House, Huddersfield; February 6, 1878.

LEUCOPHASIA SINAPIS AT REST.—Had my dear friend, the late Edward Newman, ever mentioned to me that *Leucophasia sinapis* had never been observed at rest, as stated by Mr. Whittle in the 'Entomologist' for March (Entom. xi. 69), I should have given him the result of my experience of this species. When Pembury, near Tunbridge Wells, was visited by me every year for the purpose of collecting *Lepidoptera*, I have often seen the insect at rest, and many of the specimens in my cabinet were so captured. It was my practice to resort to the woods frequently at night, and by the artificial light of my lantern I found that *L. sinapis* was more easily seen at rest at that time than during the day. Its appearance was then conspicuous by the sides of the drives; and it invariably carried its wings closed over the back, as is the case with all the *Pieridæ* with which I am acquainted. I am inclined to think that the specimen seen by Mr. Whittle had but recently emerged from the chrysalis, and that its wings were limp.—J. JENNER WEIR; 6, Haddo Villas, Blackheath, March 3, 1878.

SPRING CAPTURES, 1878.—While staying in Norfolk, at Lord Walsingham's, during the last week in February, I took a male specimen of *Nyssia hispidaria*; and also saw flying round the hall-lights *Hybernia leucophearia* and *H. progemmaria*. In Epping Forest *N. hispidaria*, *Phigalia pilosaria*, *Amphydasis prodromaria*, and *H. leucophearia*. In thistle-stems, in same locality, larvæ and pupæ of *Ephippiphora scutulana*, commonly. This is, I believe, the first time *N. hispidaria* has been recorded from Norfolk.—THOS. EEDLE; 40, Goldsmith Row, Hackney Road, E., March, 1878.

EARLY APPEARANCE OF INSECTS.—The effects of the mild winter we have just passed are now to be noticed in the unusually early appearance of some of our spring species of insects; and, should we not experience any very sharp frosts or a long continuance of east winds, entomologists may look forward to a season that promises to be a much more successful one than we have enjoyed of late years. On the 3rd of March I saw a very lively specimen of *Gonepteryx rhamni* in a garden at Wandsworth; and a single specimen of *Biston hirtaria* and *Hemerophila abruptaria* in a London Square this morning. These are the earliest dates at which I have ever observed these species. Last week a specimen of *Mamestra brassicæ* was brought to me, which had flown in through an open window: it was in fine order, and had evidently only recently emerged from the pupa.—WALTER P. WESTON; 1, Duncan Terrace, N., March 20, 1878.

SELENIA ILLUSTRARIA.—I have already at this early period of the season bred six specimens of *Selenia illustraria*, one of which is a small female exceedingly rich in colour. This is unusually early, and possibly forebodes an exceptional season.—J. R. WELLMAN; 14, Portland Place North, Clapham Road, March 16, 1878.

SERICORIS DOUBLEDAYANA.—While collecting during the last week in July, 1877, on the banks of the River Bure, Norfolk, I found *Sericoris Doubledayana* not infrequently. This species may easily be overlooked, as it flies gently amongst marsh-fern (*Lastrea thelypteris*), bog-myrtle (*Myrica gale*), and reeds, in the late afternoon sunshine. It is necessary to separate the stems and actually look for the moths, so little do they rise above the under-growth. They were in beautiful condition at this date.—E. G. MEEK; 56, Brompton Road, London, S.W.

HEUSIMENE FIMBRIANA.—A fine female of this species appeared in one of my cages on the 20th of February last, being the earliest date of appearance that has come under my notice.—W. MACHIN; 22, Argyle Road, Carlton Square, E., February 23, 1878.

ÆCHMIA DENTELLA AND EPHIPPIPHORA NIGRICOSTANA.—At the end of May, 1866, I beat from the flowers of the common elder four fine specimens of *Æchmia dentella*; and from the same hedge, at Plumstead, six specimens of *Ephippiphora nigricostana*, which had evidently but recently emerged from pupæ. I have since reared the latter species from the roots of *Stachys sylvatica*.—ID.

COLEOPHORA PALLIATELLA.—When beating for larvæ generally, in June last, at Bishop's Wood, near Selby, I found seven cases of *Coleophora palliatella*, from which I reared five beautiful specimens. This is, I believe, the first record from Yorkshire of this species.—W. PREST; 13, Holgate Road, York, March, 1878.

ADDITIONS TO DR. POWER'S LIST OF IRISH COLEOPTERA.—I should say that anyone wishing to investigate the *Coleoptera* of Ireland should give the northern counties a fair trial. As regards my experience I can only speak of the district surrounding Glenarm, say within a radius of five miles. I have not zealously investigated this locality, the *Coleoptera* only being a secondary consideration with me. When in search of *Lepidoptera* I have taken at different times over two hundred species, some local and not uncommon, and I have no doubt the list could be considerably extended. Glenarm lays within easy distance of Larne and Belfast; is situated in a vale opening on the bay; a river runs through the valley, which is well wooded on each side, and covered with a carpet of the brightest verdure. The following are a few additions to Dr. Power's list:—*Elaphrus cupreus*, wet places, common. *E. riparius*, wet places, common. *Loricera pilicornis*, common. *Cychrus rostratus*, not very common. *Carabus nitens*, common under moss. *C. clathratus*, common under moss. *C. granulatus*, common under moss. *Leistus spinibarbis*, abundant. *L. fulvibarbis*, abundant. *L. rufescens*, abundant. *Clivina fossor*, common in gardens. *Dromius 4-maculatus*, common in gardens. *Calathus cisteloides*, common. *C. mollis*, common. *Anchomenus junceus*, locally abundant. *A. livens*, locally abundant. *A. dorsalis*, locally abundant. *A. lævis*, locally abundant. *A. viduus*, locally abundant. *Bradycellus rufulus*, uncommon. *Pterostichus niger*, common. *P. melanarius*, common. *P. nigrita*, common. *P. erythropus*, common. *Amara obsoleta*, sandy places. *A. communis*, sandy places. *Harpalus æneus*, under stones. *Trechus micros*, local. *Bembidium guttula*, sweeping. *B. nitidulum*, common. *B. velox*, common. *Agabus bipustulatus*, in peat holes. *Gyrinus natator*, in peat holes. *Homalota gregaria*, rotten wood. *Tachinus proximus*, common. *Quedius impressus*, common. *Creophilus maxillosus*, common. *Gastrophysa raphani*, abundant on dock. *Ocypus cupreus*, abundant. *O. morio*, abundant. *Philonthus æneus*, abundant. *Othius fulvipennis*, abundant. *Necrophorus mortuorum*, abundant.

Silpha opaca, under carrion, abundant. *S. nigrita*, under carrion, abundant. *S. atrata*, under carrion, abundant. *Hister neglectus*, sweeping, abundant. *H. cadaverinus*, sweeping, abundant. *Aphodius fossor*, common, river bank. *Apion assimile*, common. *Chrysomela didymata*, common. *Telephorus discoidens*, foliage, common. *T. flavilabris*, foliage, common. *T. testaceus*, foliage, common. *T. bicolor*, foliage, common. *T. nigricans*, foliage, common. *Elater cinnabarinus*, under stone, scarce. *Phyllobius oblongus*, common. *P. uniformis*, common. *Necrobia rufipes*, common. *Catops tristis*, common.—THOMAS BRUNTON; Glenarm Castle, Larne, North of Ireland, January, 18, 1878.

AROMIA MOSCHATA.—I have just noticed the capture of *Aromia moschata*, in Dumfriesshire, mentioned in the December 'Entomologist' (Entom. x. 304). Although this is the first instance I have heard of the perfect insect in Scotland, I may mention that, in the July number of the 'Scottish Naturalist' for 1875, I notified the capture, in Haddingtonshire, of the larvæ of the above-mentioned insect.—A. BUCHAN-HEPBURN; Junior Carlton Club, February 1, 1878.

RANATRA LINEARIS ATTACKING CARP EGGS.—In the last session of the Naturforschende Gesellschaft of Görlitz, the President, Dr. Peck, made an interesting communication on a newly-discovered enemy of the carp. It appears that large numbers of the spawn of this fish are attacked by the water-bug (*Ranatra linearis*), which fastens itself firmly on the back of its prey with its fore feet, and by means of its sharply-pointed trunk sucks out the small amount of blood in the young organism. A series of experiments, conducted in some large establishments for fish culture, show that the only method of fighting this new foe is to drain the ponds dry and re-stock them with fish.—'NATURE.'

FAILURE OF TRIFOLIUM INCARNATUM.—It is well known that *Trifolium incarnatum* soon after its appearance above ground suddenly disappears. In common with many others I have been at a loss to account for this. It was explained by a friend of mine drawing my attention to a small brown insect, something like a beetle, about a quarter of an inch long, which found a refuge in the top joint of the stubble, on which the seed is usually drilled without being moved by the plough. I sent some specimens to Mr. Murray, who for some years has devoted his attention to destructive insects, and whose death I was sorry to see recorded. Mr. Murray pronounced the insect to be of a destructive

nature to pea and other crops. This season we slightly skimmed the stubble, and got rid of the wheat-stalks as well as we could. The plant on land so treated has not failed, though near at hand that drilled on the unmoved stubble has failed, in which cases I found the insect in its place of refuge, the first joint of the straw left as stubble. This may be known to others, though new to me.—J. C. CLUTTERBUCK.

[This little insect depredator was probably *Sitones*, which is so fond of hiding in the stubble. The whole proceedings are altogether confirmatory of my remarks (Entom. x. 213). E. A. F.]

NATIONAL ENTOMOLOGICAL EXHIBITION.—This Exhibition was held at the Royal Aquarium, Westminster, March 9th to 23rd, and was highly successful. It has been found impossible to furnish an adequate report this month, but an interesting paper will appear in the May number.—ED.

REVIEW.

Illustrations of Varieties of British Lepidoptera. By
S. L. MOSLEY. Part I. Huddersfield, 1878.

Mr. Mosley deserves every credit for the manner in which he has brought out the first part of this curious series. It requires much confidence on the part of an author now-a-days to issue a book consisting principally of plates, all coloured by his own hand. In this first number are six plates, representing the genera *Colias*, *Smerinthus*, *Callimorpha*, *Chelonia*, *Liparis*, and *Abraxas*. The best figures are those of *Colias Edusa* and *Abraxas grossulariata*. In colouring his plates Mr. Mosley has been generally successful; but we would suggest that the letterpress descriptions might with advantage be extended, especially with regard to localities of capture, and any circumstances likely to lead to our ascertaining the causes of these sports of Nature. We suppose there is some difficulty in obtaining subjects for this work, for several have already been recently figured, and others are not so exceptional as we might expect; but this improvement in choice will increase as the work becomes better known. Altogether the author may be congratulated on his effort in the cause of Science. He sets a good example to the many who will look over his book with more than passing interest.

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VARIETY OF *CIDARIA SUFFUMATA*.

By JOHN T. CARRINGTON.



CIDARIA SUFFUMATA (VARIETY).

THE very beautiful example, an extraordinary variety, of *Cidaria suffumata*, from which the accompanying figure is drawn, is kindly lent by Mr. Geo. T. Porritt, of Huddersfield. It was captured at Almondbury, near Huddersfield, where it was disturbed from amongst underwood, in May, 1871. The carefully-drawn figure, given above, renders unnecessary any description of the very marked variation from the type of *C. suffumata* in this specimen. It may be well to remind our readers that, excepting in the well-known unicolorous form (*Piceata*), this species is not usually prone to variation.

FIRST NATIONAL ENTOMOLOGICAL EXHIBITION.

THIS Exhibition was held at the Royal Aquarium, Westminster, from the 9th to the 23rd of March, and attracted the attention of numerous entomologists, besides being of considerable interest to the general public.

The following gentlemen accepted the invitation of the Royal Aquarium Society to act on the Committee:—Sir Sidney Smith Saunders, C.M.G. (chairman); J. Jenner Weir, F.L.S. (vice-chairman); Sir Thomas Moncreiffe, Bart.; G. W. Bird; Edwin Birchall, F.L.S.; Fredk. Bond, F.L.S.;

J. B. Bridgman; S. J. Capper; John T. Carrington; Rev. H. Harpur Crewe, M.A.; Rev. T. W. Daltry, M.A.; Thomas Eedle; G. Elisha; E. A. Fitch; Battershell Gill, M.D., F.R.C.S.; H. Goss, F.L.S.; Rev. Joseph Greene, M.A.; Noah Greening; C. S. Gregson; W. L. Horley; W. F. Kirby; W. H. Lowe, M.D., F.R.C.P.; Rev. O. P. Cambridge, M.A.; G. T. Porritt, F.L.S.; J. A. Power, M.A., M.D.; W. Prest; J. G. Ross; Frederick Smith; Samuel Stevens, F.L.S.; Howard Vaughan; J. R. Wellman; W. P. Weston; and F. Buchanan White, M.D., F.L.S. Most of the London Entomological and Microscopical Societies sent delegates to discuss the necessary preliminaries. Mr. A. B. Farn gave his services as Secretary; and a sub-Committee was afterwards elected by the general Committee, consisting of Messrs. Carrington, Farn, Meek, Vaughan, Jenner Weir, Wellman, and Weston, upon whom fell the task of compiling the Catalogue, the assortment of the cases exhibited, and the whole of the general arrangements. The management of the Exhibition, after the opening, was carried out by Mr. Carrington.

All orders of insects were well represented; and the invitation to exhibit was most cordially responded to by numerous entomologists from all parts of the country, many of whom sent the whole of, and others very extensive selections from, their cabinets.

In the *Coleoptera* were the complete collections of Dr. Power, and of the late T. Wilkinson, of Scarborough, exhibited by Mr. E. G. Meek; and the *Curculionidæ* of Mr. S. Stevens. Mr. G. C. Champion also sent the greater part of his collection, which certainly bears away the palm for its beauty of arrangement. Amongst his numerous rarities were especially noticeable two out of the four known specimens of *Amara alpina*; a series of *Harpalus 4-punctatus*; single specimens (unique as British) of *Leptusa testacea*, *Aleochara hybernica*, *Cardiophorus rufipes*, *Homalota egregia*, and *H. rufotestacea*; three examples of the rare *Emus hirtus*; two *Compsocilus palpalis*; and specimens of the two rarest species of *Aphodius*—*A. scrofa* and *A. consputus*. There were also examples of *Phosphæus hemipterus*, *Anthicus bimaculatus*, a series of *Lymnæxylon navale*, and an almost perfect collection of *Anisotomidæ*, including two out of the three known specimens of *Anisotoma pallens*, and fine series of *Agaricophagus* and *Colenis*.

Dr. Power's collection has comparatively few gaps of insects known to be British, besides a large number of series of very rare insects, including *Lebia Crux-minor* and *Quedius dilatatus*, in all stages of development. Of unique species there are *Borboropora Kraatzii*, *Stenus oscillator*, *Ceuthorynchus suturalis* and *C. pulvinatus*, *Apion sipeticum*, *Orchestes sparsus*, *Thyamis fuscata*, and *Agriotes pilosus*. Amongst the species, of which only one or two examples exist in other collections, were *Lebia hæmorrhoidalis*, *Carabus auratus*, *Agabus tarsatus*, *Tachynsa coarctata*, *Amara infima*, *Anchomenus gracilipes*, *Hydroporus unistriatus*, *Stenus glacialis*, *Anisotoma curta* and *A. lunicollis*, *Ptomaphagus varicornis*, *Oxylæus variolosus*, *Telephorus ater*, *Scaptia nigricans*, and many others. The collection of *Geodephaga*, *Hydrophilidæ*, *Hydradephaga*, *Curculionidæ*, and *Halticidæ*, was almost complete.

Mr. Stevens's *Curculionidæ* were very rich in species, comprising *Rhynchites Bacchus* and *R. auratus*, *Tropideres sepicola*, a series of *Bagous binodulus*, *Procas picipes*, and both sexes of *Apion lævigatum*.

Mr. West exhibited a very fine *Calosoma sycophanta*, taken a few years ago in the Isle of Wight.

The only exotic *Coleoptera* were a selection from West Africa and Ashantee, sent by Mr. Swanzy, consisting chiefly of *Lamellicornes* and *Longicornes*, including some very fine examples of the "Goliath" beetles (*Golithus Drurii*).

The *Hemiptera* were represented by the very fine collection of Dr. Power, which is one of the most complete in Britain, and contains large series of some very rare species. Perhaps the most notable are a specimen of *Lygæus equestris*, of which there is but one other; *Sehirns costatus*, a series; *Eremocoris plebeius*, which is unique; *Notochilus limbatus*, believed to be unique; fine series of *Chilacis typhæ* and *Dictyonota Fieberi*; a series of the very rare *Mesovelius furcata*; *Capsus scutellaris*; all four species of *Acanthia*; *Salda Flori*, a series; *Metastemma girpula*, it is said there is only one other; *Hydrometra aspera*, a new British species, only taken by Dr. Power; large series of very rare *Aphelochira æstivalis*; a mass of *Corixas*; series of *Sigara Scholtzii*, only taken by Dr. Power; and *S. Poweri*, unique.

The collection of British aculeate *Hymenoptera*, exhibited by Mr. Frederick Smith, is the most complete ever formed, containing not only fine series of almost every known species, but also examples of others not in any other cabinet. Among

the rarer species may be named *Prosopis cornuta* and *P. variegata*; *Andrena Haltorfiana*, *A. ferox*, *A. mouffetella*, and *A. polita*; *Halictus sexcinctus*, *Macropis labiata*; the unique specimen of *Rophites quinquespinosus*, captured last year at Guestling, near Hastings; *Nomada Bridgmaniana*, *N. armata*, *N. baccata*, and *N. Roberjeotiana*; *Osmia parietina*, *Heriades truncorum*, and *Megachile pyrina*. There was also a remarkable hermaphrodite of *Anthophora acervorum*, having the left side male, with the intermediate leg elongated and fringed, whilst the opposite leg was of the ordinary female type; as well as hermaphrodite examples of *Andrena nitida*, *Nomada baccata*, and *Apis mellifica*. The humble-bees contained a splendid series of *Bombus Smithianus*, and four examples of *B. pomorum*, not in other British collections. The *Formicidæ* contained every known species found in this country. The drawers of fossorial *Hymenoptera* were full of rare species, especially *Methoca ichneumonoides*, *Pompilus sericatus* and *P. notatus*, *Ceropiles variegata*, *Aporus unicolor* and *A. femorata*, *Miscophus bicolor* and *M. maritimus*; also *Artata stigma*. Among the *Vespidæ* were a fine series of the very local *Eumenes coarctata*; and of *Odynerus lævipes* and *Vespa arborea*, both being first discovered by Mr. Smith. The tongues of the genera of bees accompanied the insects; exhibiting in a very instructive manner the gradual development of that organ, from the short, blunt, wasp-like tongue of the genus *Colletes*, to the elongate form found in the groups *Anthophora* and *Bombus*.

Sir Sidney S. Saunders lent a collection of Grecian *Hymenoptera*, with their galleries and cells formed in the stems of various briars, as well as their parasites and larvæ. Amongst them were specimens of *Osmia tridentata*, *Megachile centiuncularis*, and the beautiful blue-black *Xylocopa cyanescens*; a fine series of the narrow-bodied *Raphioglossa eumenoides*; and *Psiliglossa odyneroides*, in which the sexes are remarkably distinct.

Amongst the remaining insects in this group were two drawers of aculeate *Hymenoptera*, sent by Mr. Goodman; and some British *Hymenoptera*, by Mr. Mapleston.

As might be expected, from the large number of entomologists who devote their attention to the British *Lepidoptera*, the cases containing insects of this group were very numerous, and included selections from nearly every large collection.

The *Diurni* of Mr. S. Stevens were very fine, and exceed-

ingly rich in varieties, containing, amongst many others, a very fine hermaphrodite *Colias Edusa*; two varieties of *Vanessa Cardui*, similar to the figure in Newman's 'British Butterflies,' one of them being very large and brightly coloured. There were also black varieties of *Limenitis Sibylla*; some extraordinary *Satyrus Janira*, in which the ground colour is entirely blanched, and others with a large colourless patch in each wing; a white variety of *S. Tithonus*; a magnificent row of fourteen *Polyommatus dispar*; some dusky and white examples of *P. Phlæas*; an hermaphrodite *Lycæna Alexis*, having the wings on the left side female, and on the right side male; other varieties of *L. Alexis*, *L. Adonis*, *Syrichthus alveolus* var. *Lavateræ*, and some bone-coloured *Hesperia linea*.

Mr. P. H. Harper, F.R.C.S., exhibited a case showing the remarkable extent to which *Colias Edusa* is prone to vary, including every gradation from the typical *Edusa* to the whitest-coloured examples of the variety *Helice*, and most of them captured during the past year.

In the drawers shown by Mr. G. W. Bird were a fine series of *Apatura Iris* and its larvæ, from Kent; and a splendid row of *Vanessa Antiopa*, five of which were captured in Norfolk, three in Yorkshire, and one each in Leicestershire and Essex.

Mr. C. A. Briggs showed a remarkable collection of varieties of the genus *Lycæna*, including one hermaphrodite *L. Ægon*, having the wings on the right side male, and on the left female; also numerous varieties of *L. alexis*, and two hermaphrodites, both having the wings on the left side male, and on the right female; a remarkable series of varieties of both upper and under sides of *L. adonis*, including two females, having streaks of the male colouring; and *L. corydon*, with the distinct blue and brown forms of the female.

Among the other specialities were an entirely black variety of *Arge galathea*, belonging to Mr. Farn; and two varieties of *Colias Edusa*, from the collection of Mr. W. P. Weston, the one having the wings on the right side the variety *Helice*, and on the left the typical *Edusa*; and the other with the anterior wings *Helice*, and the posterior wings *Edusa*.

The Rev. Windsor Hambrough exhibited a drawer of rarities, including hermaphrodite *Colias Edusa*; a remarkable variety of *Vanessa urticæ*, in which the usual black markings were concentrated into four confluent blotches; varieties of *Lycæna Corydon* and *L. agestis*; and the specimen of

Argynnis, captured in the New Forest, and named *Niobe* by the late Mr. Doubleday, but upon its correctness there seems to be some doubt. There was also a specimen of *Callimorpha Hera*, taken on a lady's dress, at Brighton; two *Deilephila lineata* and one *Chærocampa celerio* from the same locality, *Acronycta alni* from Warwickshire; *Sterrhæa sacraria* from Hampshire; and many others of equal interest.

Mr. G. Elisha kindly sent the whole of his fine collection; and his example was followed by Mr. Wellman, whose collection is a thoroughly typical one, well worked up, and the insects in splendid order, the greater portion of them having been reared by himself. Amongst them we noticed a bred series of *Melitæa Artemis*, chiefly from Ireland; some yellow forms of *Zygæna trifolii*, reared from larvæ; fine varieties of *Bombyx callunæ* and *Angerona prunaria*; dark varieties of *Tephrosia crepuscularia* and *T. biundularia*; a specimen of the male *Biston hirtaria*, assuming the colouring of the female; a fine *Platypteryx sicula*; and the remains of a specimen of *Boletobia fuliginaria*, rescued from a spider's web at Wandsworth.

In the *Nocturni* were two drawers containing the genera *Smerinthus*, *Acherontia*, *Callimorpha*, and *Chelonia*, exhibited by Mr. A. H. Jones; and a fine collection of *Sesiidæ*, containing examples of *S. culiciformis*, having the band yellow; and some *S. spheciformis*, from Tilgate Forest, shown by Mr. Bird; who also sent a drawer of *Notodontidæ*, including some dark varieties of *Clostera curtula*.

Dr. Gill exhibited his *Eupitheciæ*, a group in which he is particularly interested, containing fine series of nearly every species, including *E. pusillata*, *E. irriguata*, *E. knautiata*, and *E. subciliata*; and single specimens of *E. arceuthata* and *E. egenaria*.

Mr. Howard Vaughan exhibited a drawer of varieties of British *Noctuæ*, including *Cymatophora duplaris*, *Mamestra abjecta*, *Agrotis cursoria* and *A. lucerneæ*, *Triphæna orbona*, *Cerastis erythrocephala*, *Dianthæcia conspersa*, and *Hadenæ protea*, besides many others; also his *Cidariæ*, including many extraordinary varieties of *C. russata*, *C. immanata*, *C. suffumata*, *C. silaceata*, and a specimen of *C. reticulata*. The especial object in exhibiting these insects was to show the marked difference between examples of the same species taken in widely-distant localities.

The fauna of the fen district of Norfolk and Cambridge-

shire was well represented by Mr. A. B. Farn, who has worked these localities indefatigably, and succeeded in taking a magnificent series of the rare *Meliana flammea*, *Senta ulvæ*, *Nonagria brevilinea* (with its variety *sinelinea*, being the form in which the line at the base of the wing disappears), *N. neurica*, a melanic (female) variety of *N. typhæ*, *Hydrilla palustris*, a series of the rare *Nascia cilialis*, and *Bankia argentula* (from Cambridgeshire), besides many others. Mr. Farn also exhibited some remarkable forms of *Triphæna orbona* var. *Curtisii*, and other curious forms from the Scilly Isles; a series of *T. subsequa*; and an extraordinary hermaprodite of *Clostera curtula*.

Amongst a drawer of varieties of *Noctuæ* and *Geometræ*, sent by Mr. J. A. Clark, was a remarkable variety of *Venilia maculata*, having the fore wings traversed near the base by a broad band of olive-green, while the only other markings consisted of four large blotches of the same colour near the outer margin.

Some cases of Scotch *Lepidoptera*, exhibited by Sir Thos. Moncreiffe and Mr. Herd, illustrative of the fauna of Perthshire, were very interesting, and included a lovely variety of *Chærocampa porcellus*, in which the ordinary colour was replaced by gray with lemon markings; and two very dark *Hepialus velleda*. Dr. Buchanan White sent with these a variety of *Odontopera bidentata*, one *Peronea grevillana*, and a series of *Ablabia argentana*; likewise a series of species in the genus *Oporabia*, with sketches, showing the points of difference.

Messrs. Porritt and Varley showed the specimen of *Chærocampa nerii* that was taken in Hemel Hempsted, October, 1876; an olive-banded variety of *Lasiocampa quercus*, from Huddersfield; a white variety of *Polyommatus Phlæas*; a very fine *Cidaria suffumata*, with the broad central fascia and shoulder-patch black, remainder of wings white (figured in this number); and four varieties of *Chelonia caja*,—one the unicolorous dusky form, the second having the usual white markings in the apical portions of the front wings a bright rosy hue, the third with the hind wings bright orange, and the fourth with a broad band of white across the fore wings (the darker markings appearing in six unconnected irregular spots or streaks), and on the hind wings the spots were confluent, forming a broad band, which occupied nearly one-third of the whole surface. Mr. W. H. Gaze exhibited selections from the old collection formed by the late Mr. Ingall, and

now in the possession of St. Bartholomew's Hospital. Mr. W. H. Thornthwaite exhibited specimens of *Heliothis scutosa* and *Noctua flammatrix*: *Luperina Dumerili* and *Margarodes unionalis* from Devonshire, in 1877. All the above, except *L. Dumerili*, were, it is stated, taken at light.

Mr. Prest, on behalf of the Yorkshire Naturalists' Society, brought up a very complete collection, including one *Pieris Daphidice*; four *Vanessa Antiopa*, from Yorkshire; six *Lycæna Acis*, taken at Cardiff in 1877; two *Deilephila Euphorbiæ*; one *D. lineata*; a series of *D. Galii*; three *Chærocampa celerio*, two of which were taken in Yorkshire, and the other in Berwickshire; a *Lasiocampa ilicifolia*, from near Ripon; local forms of *Hepialus velleda*; some streaky varieties of *Arctia lubricipeda*; an hermaphrodite *Epione respertaria*; single specimens of *Eupithecia extensaria* (Yorkshire, 1873) and *Eubolia mæniata* (Yorkshire, 1872); some remarkable melanic varieties of *Eupithecia albipunctata*; specimens of *Platypteryx sicala*, *Dicranura bicuspis*, *Acronycta alni*, *Xylina conformis*, and many other rarities. Also a web, spun by the larvæ of *Ephestia elutella*, nearly eight feet long and four feet wide, found on the walls of a chicory warehouse in York, and described in a former number of the 'Entomologist.' It may be added that when twisted into a rope-like form this web had supported a weight of fifty-six pounds.

Mr. E. G. Meek exhibited two drawers of insects from the south-west coast of Ireland, containing amongst others a series of *Procris statice*, of which it was remarkable that both sexes were the same size; also a selection of *Lepidoptera* from Scotland, including a long series of *Noctua sobrina*, *N. neglecta*, *Pachnobia hyperborea*, *Hadena glauca*, *Tæniocampa gothicina*, and *Anarta melanopa*; and a drawer containing *Crambus uliginosellus* and *Schænobius gigantellus*, and other insects from the Norfolk fens.

Amongst the other numerous *Macro-Lepidoptera* were the exhibits of Mr. J. Bryant, containing a remarkable variety of *Lasiocampa quercifolia*: of Mr. W. Harper, containing *Argynnis Lathonia*, taken at Darenth Wood in 1868, and specimens of *Deilephila Galii*, *Cymatophora ocularis*, *Agrotis Ashworthii*, and *Plusia orichalcea*; and of Mr. F. Bartlett, with a pale variety of *Liparis dispar*, *Cymatophora diluta* and variety, *Leucania albipuncta*, *Triphæna subsequa*; and the specimen of *Euperia fulvago* taken in Highgate Wood in 1870.

The *Micro-Lepidoptera* were represented by the entire collections of Mr. P. H. Harper and Mr. Machin. In the former were examples of *Coccyx cosmophorana* and *C. pygmæana*, *Ephippiphora ravulana*, *Penthina Grevillana*, *Mixodia Bouchardana*, and several *Peronea umbrana* and *Spilonota pauperana*. Mr. Harper is also particularly rich in the genera *Coleophora* and *Nepticula*. Amongst Mr. Machin's insects were specially noticeable *Madopa salicalis*, *Sophronia emortualis*, a series of *Cryptoblabes bistrigella*; and a magnificent collection of the *Peroneas*, especially the varieties of *P. cristana*.

Mr. Machin also sent the whole of his *Tineinæ* and *Pterophori*,—for beauty of preservation and correctness of nomenclature his nineteen drawers of *Micro-Lepidoptera* excelled all others; Mr. W. P. Weston, the two first boxes of his *Tortrices*; and Mr. West, the specimens of *Leptogramma scabrana* bred from the eggs of the so-called species *Boscana*.

Mr. Weir exhibited his *Tineinæ*, in which each species was mounted on a separate cork tablet, so as to facilitate re-arrangement without injuring the specimens. This system was both interesting and unique.

The most interesting and instructive exhibit was undoubtedly the magnificent collection of preserved larvæ, sent by Lord Walsingham, containing nearly four hundred species, showing the larvæ in different stages of development, and arranged in the most natural manner on dried, or imitation pieces of their respective food-plants; and above each species was a single imago, representing the species to which the larvæ belonged.

Several cases illustrated the ravages of the larvæ of *Cossus ligniperda*; and the five large drawers sent by Mr. J. S. Capper, of Liverpool, contained a typical and educational collection of all orders of British insects.

The exhibits of Messrs. Barker, Davis, Eedle, and others, also illustrated the life-history of several species of British *Lepidoptera*, and other orders of insects.

Amongst the exotic *Lepidoptera* were specially noticeable the fine collection of *Ornithopteras* and *Papilios* of the world, sent by the Rev. F. A. Walker. Amongst the former were *Ornithoptera Cræsus*, so named from the black and gold colouring of the male; and some perfect males of the rare *O. Brookeana*, from Sarawak. The *Papilios* comprised examples of the rare *Papilio Semperi*, from Mindanao;

P. Gundlachianus, from Cuba; *P. Zalmoxis*, from West Africa; and two singular butterflies, from the Himalayas, *P. Payani*, in colour closely resembling a withered leaf. There were also a fine series of *P. Parsodes* and *P. Sesostris*, and other South American species, in which the green markings of the male are replaced by white in the female; *P. Brutus* and *P. Merope*, which possess the peculiarity of having the female sometimes cream-coloured and tailed like the male, and in other instances black and white, or black and tawny and tailless; and some curious varieties of *P. Memnon*. In one drawer were examples of the closely-allied *P. Demoleus* and *P. Erithonius*, the former of which occurs in Africa and Madagascar, while the latter is confined to Asia and Australia.

Mr. Swanzy exhibited some drawers containing illustrations of protection afforded to some species of butterflies which are eagerly devoured by birds and other insectivorous creatures, by resembling other species, which from their power of emitting an extremely unpleasant odour are never, or very rarely, attacked by them. Amongst them were examples of *Diadema Bolina*, which mimics *Danaïs Archippus*; *Acræa Gea*, mimicked by *Panopea Hirce*; and *Danaïs Damocles*, by *Diadema Damoclina*. The female of *Papilio Merope* seems to be protected by two species: on the Gold Coast by *Danaïs Niavius*, which closely resembles the variety of the female that is found there; and by *Danaïs Echeria*, which is rare in that locality, but abundant in Natal, where the female *P. Merope* closely resembles it.

Some drawers, lent by Mr. Jenner Weir, also contained instances of the imitative resemblance existing between the *Danainæ* and *Heliconiæ*.

Mrs. Skeen exhibited a collection of insects from Ceylon; but as none of them were named they lacked some of the interest they would otherwise have attracted.

Examples of South American butterflies, including the splendid *Morpho Cypris*, were shown by Mr. Meek; some Mexican *Lepidoptera*, by Mr. J. A. Clark; some cases of Himalayan butterflies, collected by himself in Nepaul, by General Ramsay (these were remarkable for beauty of condition and preservation, besides containing at least one new species). Some Brazilian *Lepidoptera* were shown by Mr. Oldham; a selection of the insects of Jamaica, by Mr. Bowrey; and several cases of miscellaneous foreign species, by other gentlemen.

Mons. Wailly exhibited some interesting cases of silk-producing *Bombyces*, as well as some living cocoons; and Mr. Ashmead, a case with specimens of the gorgeous *Urania Madagascariensis*, from Madagascar.

The *Arachnidæ* were represented by one drawer, sent by Mr. Hillman; who also sent two drawers containing galls and other excrescences caused by insects on plants. The only other galls were sent by Mr. Billups. Mr. Wakefield contributed some *Neuroptera* from New Zealand.

There were also some hibernating larvæ of *Chelonia villica* sent by Mr. Reed; and *Acidalia scutulata*, *A. rusticata*, and *A. immutata*, showing his very successful method of breeding, by Mr. H. Bartlett; while Mr. C. Willmot showed some living specimens of water insects.

Some combs, surrounded by the paper-like envelope of *Vespa vulgaris*, with hibernating females, were shown by Mr. Trew; and a case of living Italian bees, with a large selection of bee-hives, specimens of produce, and apparatus for bee keeping, by Messrs. Neighbour and Sons.

A separate department was set apart for microscopes, of which there were over forty exhibited; and which, from the amount of attention they received, appeared to be especial objects of interest to the public.

The method of mounting insects for microscopic examination without pressure, introduced by Mr. Enoch, must, we think, revolutionise the present system of mounting entomological subjects. A knowledge of the muscular structure can by this process be obtained, which it is impossible to be gained by a study of the specimens when squeezed out of all shape by the old system of mounting.

The walls of the galleries in which the Exhibition was held were hung with diagrams and water-colour drawings. Amongst the latter were a series illustrating the larvæ of thirty-eight species of the genus *Eupithecia*: these were executed in admirable style by Mr. W. Buckler, and lent by the Rev. H. H. Crewe. Fifty coloured drawings of exotic butterflies, by Mr. S. L. Mosley, commanded universal admiration. Mr. C. S. Gregson sent a number of photographs of his very fine varieties of *Abraxas grossulariata*; and some exceedingly interesting sketches, from nature, of the life-histories of several of the *Pterophori*, &c.

The only example of fossil Entomology was contributed by Mr. E. Charlesworth, who sent his celebrated Stonefield fossil butterfly.

It is our pleasing duty to add that we believe in every instance, with one exception, the exhibits were received and returned without damage or depreciation. This is a source of some congratulation, when we consider how fragile were the subjects.

From a popular point of view the Exhibition was a complete success. During the fortnight it was open it was visited by upwards of 70,000 people; and the manner in which large numbers of persons went carefully through, with catalogue in hand, showed more than passing interest. It was favourably noticed by about forty scientific and other papers, one contemporary only adversely criticising; but as that communication is anonymous it is unnecessary to further notice it. Taken as a whole the Exhibition was interesting enough to be popular, and scientific enough to be instructive.

The Exhibition, further, quite fulfilled the intention of its promoters; for, besides their endeavour to make Entomology a popular study, it was the means of bringing together a large number of entomologists from all parts of the country, many of whom, though known to one another by correspondence, had never met before; and by an exchange of experience they were enabled materially to add to each other's store of knowledge. So that, besides the opportunity of examining the finest collection of insects ever brought together, many entomologists will have most pleasant and profitable recollections of the time they spent at the First National Entomological Exhibition.

A. B. FARN,

The Dartons, Dartford, Kent.

W. P. WESTON,

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NOTES ON VARIATION IN COLOUR IN CERTAIN LARVÆ.

By H. M. GOLDING-BIRD.

SOME interesting correspondence was published a few months ago on the subject of "Melanism in certain Moths;" and though the subject is hardly akin to mine, yet it was this that first led me to mark particularly the modification of colour to which certain larvæ are subject when removed from

their natural surroundings. I noticed this disposition especially in *Catocala nupta* and *Biston hirtaria*, two larvæ which, in the newer squares of western London, occur together, and are occasionally found side by side on the trunks of various species of poplar, willow, &c. On the 14th of June I found six larvæ of *C. nupta* on a small bough of willow: they were a little over a quarter of an inch in length, of a pale brown colour, with no perceptible markings. These I put into a glass pan with their food and some old flannel, as I had before noticed their fancy for resting on damp pieces, which at one time I had wound round the stalks of their food to keep it fresh: they are fond of lying close against it, clasping it with all their legs, of which the first two pairs are conspicuous from their length, whilst the rest are partly hidden by the curious fringe above them; they hide themselves in a fold of the flannel when about to moult. These six larvæ never gained in colour; their markings were scarcely to be traced; they remained very little darker than the flannel during the whole of this stage of their existence.

After I had had these larvæ a short time I found another on the same bough, quite different in appearance and character. It was very dark, mottled with gray and black; the cilia more conspicuous, probably owing to the dirt it had collected in crawling about the bough. This larva had recently moulted. I put it in with the others; and when in time it went down into the flannel to change its skin I watched for its reappearance with interest, wondering whether confinement would modify the colour. Its new coat was several shades paler than the skin it had cast; and by the time it was full fed its colour was exactly similar to the others.

In the early part of July I found several nearly full-fed larvæ on the trunks of trees—willow, Lombardy poplar, and one on balsam poplar (possibly this last larva may have crawled from a neighbouring willow, as it never touched the leaves of balsam poplar with which it was supplied, preferring the same fare as its companions). These larvæ were close against the tree, in little hollows in the bark; when touched they turned fiercely round, swinging their heads from side to side, intimating very clearly that they had a strong objection to being touched, and that they meant to do battle for their liberty. When I had got them safely off they continued to wriggle, trying to start from my hand, as if they had some dim consciousness of their future powers of flight. These,

during the time that remained until they were full grown, retained this intolerance of handling, differing altogether from those I had fed in-doors, which took no notice when they were touched or moved about, although I often tried to excite them into motion, so as to see their peculiar mode of walking. The wild larvæ generally hid themselves in the flannel by day, crawling out stealthily at night, as if they could not accommodate themselves to the idea that they need no longer take precautions against their out-of-door enemies. But more striking than this difference in disposition was that in colour: the wild larvæ were as dark as the smoky trunks they rested on; so different from the first six that hardly anyone, judging from colour alone, would have thought them identical.

Thus it is worth remarking that the larvæ of *C. nupta*, in the early part of their existence, when they are not strong enough to crawl far to their food, rest on the young willow twigs, which they closely resemble in colour. When they grow strong, and are too large to rest comfortably on the slender stems, they assume the colour of the trunks, so that they are always difficult of detection. Alone, this would not have much weight, as most larvæ have a tendency to become darker as they grow; but it is curious to find that these larvæ do not seem to grow darker when withdrawn from their proper surroundings, but that they adapt themselves to the colour of the object on which they rest.

It occurred to me that if I could put a young larva under the same conditions as to colour which would belong to it in a natural state, it would show the dark colour and markings of the wild larvæ. On the 14th of July I found a young larva on willow, so late in the season that I feared it might be ichneumonated. This ultimately proved to be the case. However, in hopeful ignorance, I put it alone into a glass pan, substituting soft black cloth for flannel to represent the colour of the tree trunk, against which it would rest: it had abundance of leaves, and was covered in with green net. Thus, as to colour, it was circumstanced as far as could be, as in nature. It was not to be expected that it would resemble the wild larvæ in disposition, having nothing to develop its jealousy for its own safety, though it might well be expected that it would assume their conspicuous markings. It grew slowly, gaining in colour steadily, till the time came for its last moult, when I hoped to see it as dark as it would have been in a natural state; but it remained so

long out of sight that I turned out the contents of the pan, and found it at the bottom, ichneumoned. It may seem hardly worth relating this experiment as it was incomplete, but that others may have better opportunities of learning whether bred larvæ may not be made to assume their proper colouring on supplying artificially the colour of their natural haunts. The larva of *C. nupta* is found during the whole of June; its life, in this stage, extending over a period of four or five weeks. I cannot speak more accurately, not having bred it from the egg.

Of *Biston hirtaria* I have only to say that a large number that I had from the egg were dull looking, of a brown colour, somewhat inclining to Indian red; the markings were not clear. It is just possible that this redness may be owing to their being kept in red earthenware pans. They would cling to their food with as much pertinacity as their wild brothers: these, which I often found nearly full grown on tree trunks, had all their dark chain-like markings. They are more conspicuous than *C. nupta*. Two only showed any remarkable difference; these were brought to me off lime, and were almost exactly the colour of the young lime leaves; so unlike the ordinary type of *B. hirtaria* that at first I was at a loss to identify them. Of these two larvæ one retained its peculiar tint till it went into the earth; the other, until I preserved it. The application of heat quickly brought it to the colour of the others that had been previously preserved, and from which I cannot now distinguish it.

I am not for a moment supposing that all larvæ kept in red pans should turn red, but that in *B. hirtaria* there is a wide difference in colour between such larvæ as have been kept in an unnatural condition and those that are found at large. Of these, a good specimen, with its dark, diamond-shaped markings, is anything but monotonous in colour, and has a good claim to beauty as it basks in the morning sun.

45, Elgin Crescent, December 21, 1877.

ENTOMOLOGICAL RAMBLES, 1877.

By J. B. HODGKINSON.

(Continued from p. 82.)

BEFORE the end of July I paid a visit to the top of Yewbarrow, Witherslack, to look up a lot of *Argyresthia aurulentella* and *A. dilectella* from the juniper. I beat

scores of bushes, only to dislodge an odd one now and then, and these were no sooner in the umbrella than they were blown out again. However, by "pegging" at it, I found odd bushes in sheltered corners that yielded as many as I cared for. The same occurred with *Macrochila marginella* the worst, scrubbiest bushes yielded most. Nothing else turned out, only odd *Zelleria hepariella*; and on the grass beneath, a little white speck now and then was seen; these were the little delicate *Elachista triseriatella* at rest, a perfect little ermine (*Yponomeuta*) in the markings and general appearance.

I now paid a visit to our marshes for *Crambus contaminellus*, from the last week in July to end of the first week in August, and only got twenty-eight specimens—about one evening's work. There was one remarkable circumstance some years since: every veneer I took was *C. contaminellus*; now the same place yields twenty of the common *C. tristellus* to one of the former. The *Crambidae* begin to fly about nine o'clock in the evening most freely, and long after dark, in the bare marshes. One seldom gets a calm night. I had one only, and then I met with twenty-four specimens of an *Elachista*(?), which I think will want a name. It is identical with specimens I took at Howth, and near Fleetwood, some years ago. I hope to breed it, as I have now the larvæ feeding. The same night a light *Tortrix* flew past me; it was too dark to see what it was, but I felt pretty sure it was *Eupæcilia manniana*. I was anxious to settle when I got home whether I had the prize or not: however it turned up a pretty fair male *E. manniana*. This was quite five weeks late.

I found moths scarce everywhere, so I set off to Arnside, a nice little village on the opposite side of Morecambe Bay to Grange, a place in which I had never collected, to enjoy myself and prospect about, and be for once a prospective idler, so that when good moth times come again I should know the country. I mounted the hill behind the village and hit a yew tree, and out flew *Eupithecia sobrinata*, I might say by the dozen; they were so abundant that I ceased to hit either the yews or the juniper; they were such a pest, quite a contrast to the opposite, Witherslack, side. The sun came out; and here was flying freely *Amphysa gerningana*, and *Peronea aspersana* in profusion. I had my net in my pocket (never without), and a few scores of boxes that were soon filled. A couple of days later I went well

stocked with both big and little boxes, as I saw *Erebia Blandina* were stretching themselves, quite limp and in such splendid order that I could not help taking a nice series: one, with a pale yellow patch instead of the brown in the upper wing. Now comes a clap of thunder; all goes dark around, and I had to begin to look for a place of shelter. A heavy shower; and then all is quite calm. Now the moths are all alive, and so am I. Whilst sheltering I was watching among some *Rosa spinosissima*, expecting *Spilonota amœnana* to turn up. I was soon amongst them, and boxed about a score. The day still keeping dark I found an old crab tree, I may say, full of *Argyresthia andereggiella*; I boxed eighty, as quickly as I could keep at work, they were so easily seen on a dark day; but when the sun is bright you cannot see this silvery species at all. Next I gave a thump at a young oak: a moth darts out to the ground. I follow it, thinking it is a flight that I had not seen for years: there it was—a splendid male *Stilbia anomala*. It seemed to know I was looking at it: up it got, and made a dart over a stone wall; but my net secured it. I saw another, but lost it. *Larentia olivata* was in abundance, but worn.

Another visit, about the 12th, I went to look for *Lycæna corydon*—to see it alive; but no luck. It used to abound along with the *Erebia Blandina*, but none have been seen for years, I am informed. However, I took *Ephippiphora signatana*, *Cleodora cytisella*, and *Gelechia rhombella*; the two latter first time in the north. *Elachista adscitella* was in abundance. Altogether Arnside seemed to be the best place for numbers that I had been at.

Last year, a week later, when it was blowing a gale, Mr. Threlfall and I found several *Yponomeuta plumbella* sheltering beneath a spindle tree; and on the top of Arnside Knot, in a fir wood, some very fine dark *Plutella cruciferella*, a queer place for a turnip feeder. By the way, a young friend of mine took twelve *Argynnis Adippe* and one *Thecla betulæ* one day, at Arnside.

The junipers in this district grow to twelve feet high, and are capital shelter for moths. There were plenty of *Argyresthia aurulentella* and some *Coriscium cuculipennella*. The fine fir woods, also, will no doubt yield well with a good season.

(To be continued.)

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from p. 88.)

Fig. 82.—Galls of *Andricus amenti*: natural size and magnified.Fig. 83.—Galls of *A. occultus*.

82. *Andricus amenti*, Gir.—The small, inconspicuous gall may be found about the middle of May, attached to a male flower of *Quercus sessiliflora* or *Q. pubescens*. It is oviform, sharply rounded at the base, somewhat elongate, and bluntly-pointed at the unattached end. It is at the most 2 millimetres long and 1 millimetre thick. At first greenish, then brownish in colour, and tolerably thickly covered with bristly, simple and short, yellow hairs. It is not succulent, thin-walled, and contains a large larval chamber without an inner gall. Dr. Girand's opinion, that this gall is developed from a stamen, admits of no doubt, as we often find the altered portions of the anther, sometimes peculiarly formed (for instance, in the shape of two slight swellings divided by a furrow), on the side of the upper half of the gall; so that, therefore, the stamen with the connective is changed into the gall. The gall appears singly or in great numbers on a catkin with the male flowers: at the fall of the bloom these catkins are generally fresh, and often somewhat thickened; the stalk is also not uncommonly bent at the spot where the galls occur. The yellow gall-flies bite themselves out, through the rind of the gall, during the latter half of May or beginning of June; while the galls themselves, often together with the stalk, remain on the tree the whole summer.—G. L. MAYR.

This little catkin-gall, which from its size would readily escape observation, has already been recorded as British. Dr. Giraud obtained the gall-flies by thousands from the 16th to the 24th of May, but I find no mention of any parasites.—E. A. FITCH.

83. *Andricus occultus*, Tschek. (Verh. zool. bot. Ges., 1871, p. 797).—In the latter half of May, when the stamiferous catkins of *Quercus pubescens* are generally fully developed, we may sometimes find some which are still undeveloped. This catkin bloom, on account of the non-development of the flower-stalk, becomes spherical, and is more or less surrounded, at the base as well as at the sides, by the divided but crowded bud-scales. If we now remove a portion of the anthers and perianth, so that the flower-stalk is laid bare, we shall see one to three reddish brown galls, of about the size of a millet-seed, in the middle of the catkin, generally on the top of the slightly-thickened stalk, which is only from 2 to 2·5 millimetres long. When the flower-bud produces more than one catkin, either each of them contains one or two galls, or the one producing galls remains spherical, whilst the others become fully developed. The gall itself is very like that of *Andricus amenti*. It is 2 to 2·5 millimetres long, oviform, pointed at the upper end as well as at the base, reddish brown; at the base it is smooth, or covered with small, extremely short, stiff bristles, whilst on the upper half it is thickly covered quite to the apex with long, rather soft, red-brown and yellow hairs. Perianth leaves may often be found springing from the gall, but I can detect no anthers. The periphery of the gall, like that of *A. amenti*, is thin, and encloses the larva chamber, or inner gall. The gall-fly leaves the gall in May, during the blooming time.—G. L. MAYR.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

VANESSA ANTIOPA IN SURREY.—A friend of mine, Mr. Bodkin, who is an artist in this neighbourhood, has to-day brought me a remarkably fine specimen of *Vanessa Antiopa*, which he caught, on April 5th, in a wood about four miles from this village. It is very perfect, and none the worse for its winter hibernation.—E. CAPRON; Shere, near Guildford, April 16, 1878.

COLIAS EDUSA IN APRIL.—On April 18th, this year, I saw

on the banks of the Great Western Railway, between Reading and Oxford, three specimens of *C. Edusa*; also one of *Gonepteryx rhamni*.—E. H. MAYCOCK; 22, Clemens Street, Leamington.

[Three specimens of *Colias Edusa* also seen at Ryde, Isle of Wight, by Mr. Liveridge, on the 22nd April.—ED.]

REVISION OF THE HESPERIDÆ.—In the current part of the 'Stettiner Entomologische Zeitung' there is an excellent monograph of the *Hesperides* of the European fauna, by Dr. A. Speyer (vol. xxxix., pp. 167—193). The views there expressed do not appear to emanate from any sensational love of change, or to establish any arbitrary or whimsical arrangement; but the conclusions are arrived at after the careful study of the structure of most of the known forms. From this it is very probable that his generic distinctions will be adopted till our, at present, somewhat meagre knowledge of this neglected group of butterflies is increased. An analytical table of the genera is given, but for present and practical purposes it will suffice to indicate to which of these genera the British species are relegated. This is, perhaps, the more necessary, since even the three genera of Doubleday's list are ignored in 'British Butterflies;' Newman, with some misgivings (B. B. p. 169) followed Herrich-Schäffer in keeping the species all under *Hesperia*. Dr. Speyer divides the group into nine genera, one only of which is new, though others are restricted and altered. Amongst these the forty-one species are rather unequally divided. Our British species occur as follows:—

CARTEROCEPHALUS, *Led.*

Palæmon, *Pall.* = Paniscus, *Fab.*

THYMELICUS, *Hub.*

Thaumas, *Hufn.* = Linea, *W. V.*

Actæon, *Rott.*

PAMPHILA, *Fab.*

Comma, *Linn.*

Sylvanus, *Esp.*

SCELOTHRIX, *Ramb.*

Malvæ, *Linn.* = Alveolus, *Hub.*

NISONIADES, *Hub.*

Tages, *Linn.*

EDWARD A. FITCH.

HELIOTHIS ARMIGERA IN GLOUCESTERSHIRE.—I caught a specimen of *H. armigera* in my felt hat at one o'clock in the day, on August 29th, near Wootton-under-Edge. It was flying (looking almost white) in the broiling sun, among the bent grasses that cover the sides of our hills. I had no

net or box with me, and the insect was in consequence considerably damaged. The moment of capture I thought it was *H. peltigera*, but found out it was not when I got home, having that insect in my cabinet. The specimen has since been identified as *Heliothis armigera*.—V. R. PERKINS; 54, Gloucester Street, Pimlico, April 4, 1878.

A RUN TO EPPING FOREST.—On Easter Monday I went down to Chingford, where I arrived about 12 a.m. I walked over to Fair Mead Bottom, which I found terribly wet from the effects of the late heavy rains. The weather, however, being warm, I put up my net, and went to work tapping the bushes for *Micro-Lepidoptera*. I took a fine series of *Perittia obscuripunctella* and *Chrysocoris festaliella*; and from the numerous *Elachista pollinariella*, which I disturbed, I secured one beautiful female. I also met with the following:—*Swammerdamia comptella* and *S. pyrella*, *Incurvaria masculella*, *Lithocolletis corylifoliella*, and one or two other *Lithocolletis* which I have not yet examined. A fair specimen of *Anticlea derivata* flew out; and a female *Aleucis pictaria*, which I have retained in the hope of getting eggs. —WILLIAM MACHIN; 22, Argyle Road, Carlton Square, E., April 25, 1878.

BOTYS TERREALIS BRED.—On March 4th I went into my breeding-room,—a very cold one, with seldom any sun; judge of my surprise at seeing a fine *B. terrealis* at rest on the window. At the same time I saw the larva crawling about in my flower-pots: I fancy it is one that should have come out last July. Finding this led me to look in my jars and other breeding apparatus, when I saw *Eupithecia pumilata* had ventured out also.—J. B. HODGKINSON; 15, Spring Bank, Preston, April 1, 1878.

INTOXICATED INSECTS.—During the fine and glorious evenings which we experienced in July, 1876, I was somewhat amused by the nocturnal visits of a certain *Tryphæna pronuba*. While collecting at sugar in the early part of the month, a friend called my attention to this peculiar but ragged individual, which was fully enjoying our sweets. In due course he became intoxicated, and had to give way to the obvious result; but naturalists tell us that alcohol acts upon the lower forms of animal life exactly in the same way as it does upon man. Now if we admit this, then we have a right to believe that its excessive use will tend to shorten an insect's life: whether it was so with this *pronuba* is a question that puzzles me, as for more than three weeks this dissipated character took every opportunity of using our sugar, and

there we found him five or six times a week as drunk as usual. However, I am inclined to think that the alcoholic mixture nourished him, so much so that he lived to a longer period than the usual term; and probably his career was then cut short simply by the ravages of some insectivorous creature.—H. T. DOBSON, JUN.; New Malden, Surrey.

[We remember trying sugar every suitable night through a mild winter, and seeing a certain specimen of *Cerastis vaccinii*, which we had marked, at the sugared tree on upwards of fifty occasions, and only lost sight of it about the middle of April.—ED.]

GREEN HAIRY LARVÆ.—At the February meeting of the Entomological Society Sir John Lubbock is reported to have read a paper "On the Colouring of British Caterpillars," in which he stated that no hairy caterpillars are green. Now I think this is trying to prove too much. A not uncommon variety of the larva of *Acronycta leporina* is a beautiful pale green, covered with rather long, soft white hair. Again, I suppose Sir John would call the caterpillar of the emperor moth, *Saturnia pavonia-minor*, a hairy caterpillar: this, when full grown, is always some shade of green. At the same meeting Sir John stated that the bright coloration and hirsute jacket of hairy larvæ acted as a warning that the species was inedible. How is it, then, that the cuckoo seems to prefer hairy and bright-coloured larvæ to smooth ones? Last autumn, when staying at Tresco Abbey, in the Scilly Isles, I was informed that a few years since a bee-eater, *Merops apiaster*, visited the islands in the autumn, and remained for some time. Its principal food was the larva of the fox-moth, *Lasiocampa rubi*, one of the hairiest of hairy larvæ. It was frequently seen to seize the larvæ, beat them to death against the ground, as a thrush does a worm, and then swallow them whole.—[Rev.] H. HARPUR CREWE; Drayton-Beauchamp Rectory, Tring, April 5, 1878.

NOTE ON DR. POWER'S LIST OF THE ADDITIONS TO THE BRITISH COLEOPTERA DURING THE YEARS 1872—77 INCLUSIVE. — In Dr. Power's list of the new species of British Coleoptera added to the list from 1872 to 1877 inclusive (Entom. xi. 62), no mention is made of several species that I think ought to find a place therein. It is true three of these (*Homalium testaceum*, *Psammodius porcicollis*, and *Thyamis ferruginea*) have already been on our lists, but either erroneously determined or of more than doubtful British origin, and are noticed as such by Mr. E. C. Rye in Entom. Annual

for 1872, and for the same reason are not included in Dr. Sharp's 'Catalogue.' The following seven species are not mentioned in Dr. Power's list:—

1. *Homalium testaceum*, Er.—E. C. Rye, Ent. An., 1873, 83. R. E. Bull. London district.

2. *Trichopteryx seminitens*, Matth.—A. Matthews, Ent. Mo. Mag. xiv., 36.: described.

3. *Plitium marginatum*, Aubé.—A. Matthews, Ent. Mo. Mag. xiv., 36. Cambridge and Norfolk fens.

4. *Anisotoma pallens*, Sturm.—E. C. Rye, Ent. Mo. Mag. x., 135; Ent. An., 1874, 86. J. J. Walker, Deal; three examples, Sept. 19, 1873.

5. *Psammodius porcicollis*, Illig.—J. J. Walker, Ent. Mo. Mag. xii., 62 & 108. Whitsand Bay, Cornwall; several examples.

6. *Apion Ryei*, Black.—T. Blackburn, Ent. Mo. Mag. xi. 128: described. Shetland Isles, July, 1874.

7. *Thyamis ferruginea*, Foud.—E. C. Rye, Ent. Mo. Mag. xii., 180. E. C. Rye and G. C. Champion. (One example, Caterham, July, 1873).

Dr. Power remarks of *Tribolium confusum*, Duv., "no doubt introduced." No one will probably dispute this; still the remark would apply equally well to *T. ferrugineum*, Fab. The two species are about equally common in collections, and are often found in company. *Scopæus subcylindricus*, Scribe, can at present hardly be numbered among British species, like some others (*Apion scrobicolle*, Gyll., *Magdalinus Heydeni*, Desb., and *Ceuthorhynchideus Crotchi*, Bris.), ascribed to Britain by continental entomologists. It requires "further verification." Additional localities for the following species, included in Dr. Power's list, seem worthy of note:—*Harpalus 4-punctatus*, Dej., Aviemore, Inverness-shire; *Anisotoma macropus*, Rye, Tilgate; *Liosomus troglodytes*, Rye, Chatham (J. J. Walker); *Nanophyes gracilis*, Redt., Tilgate, in profusion, August, 1875; and *Orchestes semirufus*, Gyll., Woking, not rare on wild cherry.—G. C. CHAMPION; 274, Walworth Road, London, April 9, 1878.

RANATRA LINEARIS.—In the April number (Entom. xi. 95) this water-bug is mentioned as having been found very injurious to carp-spawn. It may be of some interest to mention that a specimen accidentally introduced into an aquarium, in water procured from a pool not far from Isleworth (I rather think from Wandsworth) did much harm to the small English

fishes confined with it, but had left the gold-fish (up to the time when I examined them) entirely free from attack. I have not myself seen the *Ranatra* in the act of preying on its victim; but the owner of the aquarium, who is a careful observer, informed me that it selected any point indifferently, simply digging its rostrum well in, and holding firmly with its legs, for which the long, curved, though clawless tibiæ and tarsi of the first pair are especially adapted. — E. A. ORMEROD; Dunster Lodge, near Isleworth, April 13, 1878.

BOOKS ON BRITISH HYMENOPTERA.—In reply to Mr. W. Gardiner, who asks for information on this head, if he thinks of studying the entire order of *Hymenoptera* he would require quite a small library. In Westwood's Introduction he is referred to all the standard works. If he intends to imply the *Aculeata*, Shuckard is good as regards generic description, &c.; but his descriptions are of generic distinctions, and are elaborated with mere specific differences. Of specific descriptions there are none. Therefore Mr. Gardiner wants the last edition of 'British Bees,' by Mr. Frederick Smith; and also the 'Catalogue of British Fossorial Hymenoptera—*Formicidæ* and *Vespidæ*,' published by the Trustees of the British Museum in 1858; also by Mr. Smith. For the *Ichneumonidæ*, Gravenhorst's '*Ichneumonidæ* Europeæ;' there is no work of the kind in English. The gall-flies he will find in the 'Entomologist;' there is no separate work complete in English.—ED.

CAMBRIDGE ENTOMOLOGICAL SOCIETY.—This Society held its twenty-sixth Annual Meeting on February 8th, 1878, when the officers were elected for the coming year, and the Treasurer presented his statement of accounts, which showed a substantial balance in the Society's favour. The number and destination of the excursions, which ought to be of a most interesting character, considering the localities chosen, was arranged. Mr. W. A. Forbes, of St. John's, Cambridge, the Honorary Secretary, requests us to notice this Society, with the object of its becoming better known. We have great pleasure in doing so, and at the same time wish its already long career and success may be extended for many years.—ED.

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NOTES ON CERTAIN PARASITIC FUNGI WHICH ATTACK INSECTS.

By F. BUCHANAN WHITE, M.D., F.L.S.



MAMESTRA BRASSICÆ.

I RECENTLY received (through Mr. Carrington) from Mr. H. Sharp, of 16, Huntsworth Terrace, Portman Market, a sketch of a dead larva attacked by a parasitic fungus. In his letter he says that while examining a fern case, last autumn, he found the larva of *Mamestra brassicæ* with fungus attached, of which a figure is given above.

Mr. Sharp's fungus is the conidiiferous condition of a species of *Torrubia*, a genus of fungi of which most of the species are parasitic upon insects. The order Lepidoptera is not the only one attacked by species of this genus, for there are records of at least four other orders, *viz.* Coleoptera, Orthoptera, Hemiptera, and Hymenoptera, having been attacked. One of the earliest accounts of such an occurrence appears in the Philosophical Transactions (for 1763) of the Royal Society, and as it is rather curious I will copy it:—
“The vegetable fly is found in the Island Dominica, and

(excepting that it has no wings) resembles the drone, both in size and colour, more than any other English insect. In the month of May it buries itself in the earth, and begins to vegetate. By the latter end of July the tree is arrived at the full growth, and resembles a coral branch, and is about three inches high, and bears several little pods, which, dropping off, become worms, and from thence flies, like the English caterpillar." The animal attacked is supposed to be the larva or pupa of a *Cicada*, and the fungus *Torrubia sobolifera*; but of course the incidents of the latter part of the story are all or mostly imaginary.

The conidiiferous state of certain *Torrubiæ* are like some of the mould fungi, and bear the spores, or seeds, attached to threads, which are often massed together to form branching clubs, mealy on the surface from the numerous globose spores. When in this state they were once referred to the genus *Isaria*, which belongs to a different family of the fungi. In the higher, or *Torrubia*, condition, which they may or may not reach (for in the lower, or *Isaria*, otherwise conidiiferous—so called from their bearing the kind of spores termed conidia—condition, the plants reproduce their species), the appearance of the plant is quite different, as it is provided with a stalk, or club-shaped head, often more or less red in colour, and in which the rod-like sporidia (as the seeds in this family are termed) are produced in certain receptacles called perithecia.

As far as I can judge from the description and figure of Mr. Sharp's fungus it *may* be *Isaria farinosa*, the conidiiferous state of the bright red *Torrubia militaris*, which is said not to be uncommon upon pupæ, but is, I think, certainly commoner in the *Isaria* than in the *Torrubia* state, which I have never found. I say it *may* belong to that fungus; but without actually seeing the specimen it is impossible to be sure, as several other species occur in this country. Amongst these are *Isaria arachnophila*, which I have found on dead spiders; *I. sphingum*, a new British species, recently recorded from Kincardineshire, where it was found on dead lepidopterous pupæ; *Torrubia entomorrhiza* and *T. gracilis* upon dead larvæ and pupæ; and *T. myrmecophila* on ichneumons, &c. Then in other countries have been found *T. melolonthæ* upon the cockchaffer, *T. curculionum* upon weevils, *T. cæspitosa* upon grasshoppers, *T. Miquelii* and *T. sobolifera* upon *Cicadas*, *T. Taylora* upon Australian caterpillars; the well-known *T. Robertsii*, so often seen in museums, which is found on the larvæ of the New Zealand *Charagia*, or

Hepialus, virescens; and several other species; making in all about twenty-five known to be parasitic on insects.

The cryptogamic parasitism of insects is a subject of which in reality we know very little. In some cases we know that the parasite attacks the living insect; in others, as in the case of some of the above-mentioned *Torrubiæ*, it seems uncertain whether the parasite confines its attentions to dead insects; though as certain *Torrubiæ* have been seen on living insects it is probable that it does not.

This parasitism is not a subject having scientific interest only, for as in the case of the disease of the silk-worm, termed muscardine,—the result of the attack of the fungus, *Botrytis bassiana*,—it sometimes causes serious commercial loss. This, or a similar, fungus sometimes attacks other larvæ, e.g. *Bombyx rubi*. Then there is another cryptogamic plant, known variously as *Empusa*, *Sporodonema*, or *Entomophthora*, the attack of one species of which—the *E. muscæ*—upon house flies, in autumn, must be familiar to everyone, though they may not know what it is. The fly attacked settles upon the wall or window and there dies, remaining, however, attached in a life-like position. A close examination will show that not only is the fly filled with fungus, but that the spores have been shed, and form a kind of halo round it on the surface on which it is standing. Fungi of this class have been noticed attacking wasps, as well as *Aphides*, and certain lepidopterous insects,—as the larvæ of *Chelonia Hebe*.*

A great deal remains to be investigated as to the nature of these fungus parasites of insects, not only as to the various species of fungi and the various states they pass through, but as to what insects are attacked, how the fungus gets access to them, how its ravages in the structure of the insect are carried on, and what are the causes which predispose an insect to be so attacked, &c. When we know all this, who shall say that a great deal of light may not be thrown upon certain diseases of the higher animals, including man himself?

For the preservation of his specimens I should recommend Mr. Sharp to pin them into a glass-lidded box (in which a drop or two of carbolic acid may be put), and not to subject them to too much direct handling.

* The fungus which has recently caused such woeful destruction amongst the salmon and other fish in the rivers of the north of England, is a member of this class. Botanists have not quite made up their minds whether these plants are fungi or algæ.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

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No. VIII. NYMPHALIDÆ—NYMPHALINÆ. ARGYNNIS, AND ALLIED GENERA.

THE *Nymphalinæ* consist of a number of well-defined genera, which it is difficult to group into sections, but which, as they are too numerous to treat of as a whole, we will deal with by the use of artificial groups founded on a certain amount of general resemblance to some well-known genus; and in the present paper we will discuss the genera allied to *Argynnis*. The atrophied front legs, combined with the open hind-wing cells, are characters sufficient to prevent the *Nymphalinæ* being confounded with other butterflies.

The two first genera, *Colænis* and *Dione*, are long-winged South American butterflies, whose real affinities are with the *Heliconinæ*. Their colour is usually fulvous, more or less banded or spotted with black. The species of *Colænis* measure about three or four inches across, and the under side is either coloured as above, or indistinctly marked. One species, *C. Dido*, differs from the others in being of a beautiful green, with black markings above, and brown and silvery ones below. It may be known at once by the whole cell of the fore wings being filled up with green. The species of *Dione* have shorter and broader fore wings (except *D. Juno*, which more resembles *Colænis* in shape), and are rich fulvous, spotted or veined with black, and the hind wings and the tips of the fore wings are covered with oval silvery spots beneath. In *D. Vanillæ* even the black spots in the cell are centred with silvery beneath; and in *D. Moneta* and *D. Glycera* the basal half of the fore wings is pale crimson on the under side.

Turning now to the *Nymphalinæ* proper we commence with the East Indian and Australian genus, *Cethosia*. It contains a number of closely-allied and very similar species, which may be distinguished from any other genus by the elegant festooned black and white marginal markings, especially on the under surface of the hind wings. They somewhat resemble *Danai*; and indeed some species appear to mimic *D. Chrysippus*, and others of the genus *Danaus*. The *Cethosiæ* are black, generally with a white or yellow band or white spots or lunules across the tip of the fore

wings, and with more or less of the hind wings and of the inner margin of the fore wings filled up either with greenish white or with some shade of tawny or fulvous, and generally marked with rows of black spots. Occasionally the pale portion of the wing is beautifully shaded with purple; and the sexes usually differ considerably, the males being often fulvous or tawny, while the females are greenish white. These insects generally average about three inches in expanse.

Some of the largest and handsomest species among the genera most resembling *Argynnis* belong to the genus *Clothilda*, which is almost confined to Cuba, Haiti, and Central America. They expand about four or five inches, and are tawny, with rows of large black spots towards the hind margins; and one species, *T. Thirza*, Hübn., has deep red markings towards the base. On the under side of the hind wings they are dark brown, without silvery spots, but marked with many slender undulating white lines.

The genus *Terinos*, from the Malay Islands, expands about two and a half or three inches, and is dark brown, more or less suffused or striped with rich purplish blue. The tips of the fore wings are prominent, but obtusely rounded, and the hind margin is suddenly concave below them. The hind wings are nearly square, slightly dentated, and with a more or less prominent projection at the outer angle; towards the hind margin they are generally varied with white or yellow.

Cirrochroa is another East Indian and Australian genus, with less prominent tips, below which the hind margin slopes gradually to the hinder angle. The hind wings are slightly and regularly dentated and curved. The wings are tawny, more or less bordered with black, especially towards the tip of the fore wings; the females of some species are brown. There are generally two dentated submarginal black lines, and a third near the middle of the wings; outside the latter (which is often silvery on the under side) runs a row of brown dots. These insects usually expand from two to three and a half inches; but the smallest, *C. fasciata*, Feld., from Borneo, expands only one inch and a half, and differs much from any other species, being brown, with a broad ochreous band running from the middle of the fore wings to the inner margin of the hind wings, beyond which are two rows of ochreous lunules, the innermost becoming a stripe on the hind wings.

Lachnoptera Iole, Fabr., from West Africa, much resembles *Cirrochroa*, but the tips of the fore wings are less prominent, and the hind wings are broader; it expands about two inches and a half, and is tawny, with a double festooned submarginal line, and traces of a third, broken into lunules. The hind wings have a very large patch of raised brown scales on the costa, and the black spots are centred with silvery beneath, and edged inside with an irregular silvery band.

Cynthia Arsinoe, Cram., is an insect expanding from two and a half to four inches across. The hind wings are nearly square, with a projecting angle or short tail, and with two eye-spots towards the hind margin. The male is tawny, with a nearly straight brown band running from the middle of the costa of the fore wings to the anal angle of the hind wings; on the under side it is joined by an oblique band running from the tip of the hind wings to the anal angle, just within the eyes. The female is greenish brown above, with a broad whitish band crossing both wings, and growing narrower towards the inner margin of the hind wings. This species is very common in the East Indies, and is also found in Africa. It is either very variable, or there are several closely-allied species.

The next three genera, *Messaras*, *Atella*, and *Euptoieta*, are of small extent, and contain species expanding about two or two and a half inches. The hind wings are rounded and scalloped, generally with a slight angular projection in the middle, which is prolonged into a short tail in *Atella Egista*. The fore wings are rather broad, with the costa more or less arched, and the hind margin is either almost straight or slightly rounded in *Messaras*, and slightly concave in the other genera. The species of *Messaras* are tawny brown towards the base, with a broad straw-coloured or orange band across the fore wings, and sometimes the hind wings also; the latter are frequently marked with a row of dark spots, within which is a bluish or lead-coloured line above, which is silvery below. The tip of the fore wings is broadly brown; and in the common Australian *M. Madestes* the borders of all the wings are deep black. *M. Erymanthis* is a common East Indian species. The others chiefly inhabit the Moluccas and the Papuan Islands. The species of *Atella* are chiefly Indian or Papuan. *A. Phalanta* is uniform fulvous, with the wings edged with festooned lines, within which is a row of black spots on all the wings, and the cell

is transversely striated with black: it is common in the East Indies and Africa. The other species (some of which have short tails) may be known from *Cirrochroa*, *Messaras*, &c., by the transverse striations in the cell of the fore wings. *Euptoieta* only contains two common American species, resembling *Atella Phalanta*, but the veins of the fore wings are black, especially in *E. Claudia*; and instead of the wings being edged by festooned lines they are edged by a double brown line, separated by rather long fulvous spots: within this runs a row of large black spots, placed between the nervures; and within this again an obsolete dark line on the fore wings, and an oblique and very irregular black line on the fore wings.

We now come to the genus *Argynnis*. It is numerous in Europe, Asia, and North America; but in Africa only on the North coast, and in South America only in Chili. Among the most striking of the larger North American species are *A. Diana*, with a black male, broadly edged with orange, and a green female spotted with whitish; and *A. Idalia*, which has reddish fore wings and blackish hind wings, with two rows of whitish spots. There are several Californian species, with yellowish instead of silvery spots on the hind wings beneath. Among East Indian species we may mention *A. Niphe*, with a fulvous male, and a female which mimics *Danaus Chrysippus* on the upper side. The hind wings are green beneath in both sexes, with slightly silvery markings. Then there are the Indian *A. Childreni* and *A. Kamala*, with the hind wings green beneath, striped with silver; and the North Chinese *A. Sagana*, the male of which resembles *A. Paphia*, while the female is olive-green, marked with white, like an *Apatura* or *Limenitis*, and was actually established as a new genus when first discovered. I have nothing special to say about the smaller group of *Argynnis*, except that it is to this that all the circumpolar, or South American, species belong.

Melitæa is common in Europe, Asia, North Africa, and California; the greatest variety and the largest known species are Californian. Many of these are black, with several transverse rows of yellowish spots, sometimes alternating with reddish ones, thus forming a higher development of the group represented in Europe by *Maturna* and *Aurinia*.

Most of the smaller tawny *Nymphalidæ* of North and South America belong to the genus *Phyciodes*, many of which closely resemble *Melitæa* above, but the under side of

the hind wings is yellowish or grayish, without sharply-defined markings. Others have very long wings, and closely resemble small *Heliconii*, or *Eueides*, being marked with black and tawny in a similar manner. Others are black, with white spots on the fore wings, and a broad white band on the hind wings. *P. Castilla* is black, with a red transverse bar across the middle of the fore wings; and *P. Leucodesma*, which is common at Trinidad, is brown, with the greater part of the wings occupied by a broad transverse white band, interrupted below the costa. The short-winged species are mostly rather smaller than an average *Melitæa*; but the long-winged species are larger, and occasionally exceed two inches in expanse.

Microtia Elva, from Central America, is a small black butterfly, about an inch in expanse, with a tawny band running from the anal angle of the hind wings to the middle of the fore wings; beyond it is a transverse tawny blotch of the same colour. *Gnathotriche exclamationis*, from Venezuela, resembles an *Archonias* (*Pierinæ*) in appearance: it is a black butterfly, with a row of oblong yellow spots across all the wings, and a yellow basal streak on the fore wings, followed by a spot. It expands about an inch and a quarter.

The South American genus, *Chlosyne*, contains black species, expanding about two inches. The fore wings are more or less spotted with white, and the hind wings have generally a large red or yellow blotch at the base. The hind wings are rounded and scalloped, and the fore wings slightly concave.

Anemeca Ehrenbergii, from Mexico, expands about two inches. The wings are rounded and entire, and are smoky brown, with yellowish fringes; the nervures of the hind wings and of the hind margin of the fore wings are broadly yellowish beneath, and slightly so on the upper side also.

In my next paper I shall proceed to consider the genera allied to *Vanessa*; but in all succeeding articles I shall deal entirely with exotic insects, as I have done in the present chapter, noticing European species only so far as may be necessary to elucidate the others; and referring those who wish for information on European species, whether British or not, to my work on 'European Butterflies and Moths,' now in course of publication.

MODIFICATIONS OF GALL-GROWTH.

By EDWARD A. FITCH.

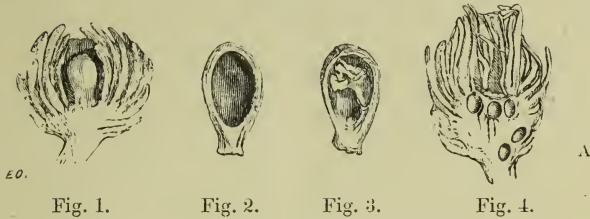


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

IN the April number of the 'Entomologist' (Entom. xi. 82) attention was called to the little-understood subject of gall-growth and gall-structure by a consideration of two or three abnormal forms. The perusal of that interesting paper has suggested to me that it may not be untimely to call attention to various other modifications. Not the modifications and monstrosities occasioned through injury or wounds to the gall itself; neither those resulting from its position as to surrounding growths and objects, nor those which may be attributed to suppressed or stimulated growth. With these external developments, of each of which many curious forms could be instanced, the causes are, to a certain extent, explicable by the scientific or observant botanist, but with the modifications that are due to internal influences the case is different; and it is to these—to such as are occasioned by the life within the gall itself—that I wish to direct attention.

In order to make my subject clear, and limit my observations, I shall confine myself specially to the well-known galls of two species of *Cynipidæ*, viz.—*Cynips Kollari* (the common Devonshire, or marble, gall of the oak) and *Rhodites eglanteriæ* (the globular gall of the rose leaf).

Before treating of these, and to serve as a preface to my remarks, I may refer to two instances of abnormal tenancy in galls,—first that of an *Andricus*, then the common history of those frequent lodgers the *Synergi*. A common gall, occurring on oak-buds, is that of *Aphilothrix gemmæ*, which is generally known as the artichoke gall. It consists of a cupule, to which the more or less modified leafy scales are attached, with a peduncular oviform inner gall. The normal section is as at fig. I; within the central inner gall the larva of the gall-maker lives. This inner gall is greatly modified by immaturity

discontinued growth through parasitism, to which it is unnecessary to refer further than to explain that fig. 2 shows the normal section of the perfectly-formed gall; and fig. 3 the same, inhabited by *Synergi*. Within this woody cupule several small oval, hard, but thin-walled chambers are frequently to be found. They are irregularly distributed; sometimes three or four are arranged side by side on the exterior of the woody growth; at others they are quite without any method, and I have found them as far down the twig, to which the gall is attached, as shown at A in fig. 4. It is these chambers that are the home of *Andricus trilineatus*. This is the only instance known of what is considered a true gall-maker being dependent on another. With this exception the galls and habits of *A. trilineatus* accord somewhat with those of its congener, *A. noduli*. The larva chamber in all single-celled or unilocular galls continues, under natural circumstances, single and hollow; but when these galls become tenanted, with those cynipideous inquilines of most of the cynipideous galls—the *Synergi*, they all exhibit in section several secondary chambers, divided by a thin vegetable septum. The study of these occasional growths is certainly necessary for correct views of the physiology of the gall itself.

Now to return to our more observable instances. First the production of *Cynips Kollari*. Its normal structure is a smooth, brown, spherical, woody or parenchymatous gall, containing a small more or less oval larva chamber in the centre (see fig., Entom. vii. 241): this is moderately hard, owing to the density of structure; the parenchyma—or what is perhaps more correctly described as merenchyma, from the openness of the structure—is entire, and radiates from it. Two internal and constant modifications occur. The first is when we find two or three chambers in the parenchyma of the gall (see figs. A and B): these are generally small, single, and invariably placed very near the base of the gall itself. The outward indications of this is small, as the gall appears perfectly normal, and the central larva chamber not being affected the life of the cynipideous tenant, or its parasite, is not interfered with. These chambers are inhabited by inquilines, mostly, if not exclusively, by *Synergus melanopus* or its parasites: their presence is to be discovered by a very minute swelling and slight discoloration (lighter) at the point affected; the perforature of oviposition is also observable in the rind. The second modification

and the most easily-recognised abnormal forms of *Kollari* galls are the half-sized, irregularly shaped, and slightly discoloured specimens which are so commonly met with, and which invariably lose their green colour (*i.e.* become ripe) later than normal specimens. In section these will show the larva chamber to be greatly enlarged and the whole structure altered: the parenchymatous tissue is hardened, and the surroundings of the central cavity is thick and hard; in fact the whole cellular tissue is condensed. This central cavity is filled with numerous chambers separated by thin septa, as before instanced in other cases of synergous tenancy: in these the *Synergus* larvæ reside. They are vegetable feeders, consequently the sap (plant juices) is appropriated by them, and the gall becomes dwarfed, and its tissues improperly nourished. Various forms of this modification occur, but it is unnecessary to particularise them: a section of one is shown in the accompanying figure (see fig. c).



Fig. A.

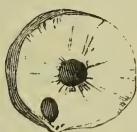


Fig. B.



Fig. C.

Particularly small, thin-walled, woody, slightly pointed, conical galls are frequently met with amongst those of *C. Kollari*. These are, I believe, galls of that species modified by a species of *Synergus*: one egg is laid in the immature cell of *Kollari*, and, as before, the sap is appropriated by the tenant, but to a greater degree than in the former many-chambered instance. It is necessary to say that the history of the production of this form from *Kollari* is only surmise; its actual proof is difficult.

Small *C. Kollari* galls.

The production of *Rhodites eglanteriæ* is a thin-walled, globular, glabrous, green or rosy gall, occurring normally on the under side of the common wild rose (*Rosa* spp.): for section see fig. α . As an instance of the gall being unaltered,

notwithstanding its production on varied organs of the plant, I may say I have found galls of this species on the side veins, midrib, and leaf-stalk of the leaflet (upper and under side); on the petiole and stipule of the leaf; and even once on the fruit of *Rosa canina*: all perfectly normal forms. The constant modifications of this gall are two, both curious and interesting. Firstly—the whole interior becomes grown-up and irregularly filled with chambers; for section see fig. γ : the only outward sign is the gall becoming brown and covered with small scattered knobs. Secondly—the normal central cavity remains, but the wall of the gall becomes thickened and regularly divided into chambers; a section of a good specimen of this modification, with the peripheral chambers complete, is particularly striking and pretty: see fig. β . The specimens



Fig. α . Fig. β . Fig. γ .

are often abnormally large and, like the former, become discoloured, and the surface becomes less glabrous and more or less warty. These two modifications are due to a similar cause with those in the oak species, *viz.*, the tenancy of phytophagous individuals. I am unable, at present, to say whether they are both attributable to the same species, for from specimens of both forms I have bred *Aulax canina*, *Eurytoma sp.*, and various parasites. *Aulax*, which is closely allied to *Synergus* and has doubtless the same economy, is the primary cause of the modification; but as to the *Eurytomidæ* it is an undecided question whether they are vegetable or animal feeders in the larval state.

The dwarfing of all galls through inquilinism and parasitism is well known and self-explanatory; but a consideration of the above-mentioned forms with those peculiar growths, mentioned in "Considerations of Gall-growth," may lead to some knowledge of the interesting, though still obscure, subject—the cause and growth of vegetable galls. In the animal kingdom we know that different irritants produce distinctly characterised effects, so in the vegetable kingdom we know that different species of insects produce different

kinds of morbid growths which are especially constant; but just as in animal disorders we frequently deal with the symptoms rather than with the evil itself, so in the vegetable world it is only by minute observation backwards, step by step, from the completed morbid growth that we can hope to arrive at its origin, and thence possibly at its cause.

Maldon, Essex, April 3, 1878.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.

By EDWARD A. FITCH.

(Continued from p. 115.)



Fig. 84.—ANDRICUS QUADRILINEATUS.

Fig. 85.—A. PEDUNCULI.



Fig. 86.

A. VERRUCOSUS.

84. *Andricus quadrilineatus*, Hart. 85. *A. pedunculi*, Schenck.—Professor Schenck, in his 'Beiträge zur Kenntniss der nassauischen Cynipiden und ihrer Gallen,' published in 1865, described a number of gall-species which are produced on the catkins of the oak, and which resemble one another in appearance very closely. Almost the whole of these forms he described from the specimens which are contained in Von Heyden's collection. Through the kindness of Herr v. Heyden I have been enabled to examine these types, so that I am now in a position to rectify some errors respecting those which belong here. Galls collected by me both last year and in the present still contain larvæ, consequently there has been no emergence. The species which I have taken into consideration are *Andricus quadrilineatus*, Hart., *A. flavicornis*, Schenck, *A. pedunculi*, Schenck, *A. ambi-*

guus, Schenck, and *A. glabriusculus*, Schenck. From Professor Schenck's description in the above-cited work (pp. 111 and 112) it is easy to see that the galls themselves differ from one another, yet when I compare these types together and those galls which belong here, collected by myself from the same tree, I do not find the least substantial difference between them; still the matter might be otherwise if the *Andrici* preserved in Heyden's collection were put by together with the actual galls in question from which they were bred. It may, therefore, be judicious to retain the Schenckian species specially. *A. quadrilineatus*.—The gall is brown, smooth, oviform, three millimetres long by two thick; its periphery is uneven, as it is traversed with raised longitudinal stripes, which are more or less united; it might also be described as having moderately deep, partly interrupted and distinct partly confluent longitudinal furrows. The dried perianth may be found at the base of the gall, and there is a rather conspicuous papilla at the apex. The gall, when broken open, exhibits a very thin, oviform, yellow-coloured inner gall, which is attached through its whole surface to the reddish brown gall tissue: that this tissue was at first soft, and later on became dried, there can be no doubt, owing to the ridges and furrows with which it is normally covered. The insect gummed on the same paper as the gall is an *Andricus*, which agrees perfectly with Hartig's description of *A. quadrilineatus*. The types of *A. flavicornis* consist of ten galls and one *Andricus*; the galls do not differ at all from those of *A. quadrilineatus*. This is the opinion also expressed by Prof. Schenck; only I must remark, for the sake of accuracy, that in some of these the furrows here and there through being deepened have convex surfaces, so that by the drying of the gall tissue the inner gall becomes exposed at these spots. In other shrivelled specimens this also happened in different ways, and the appearances described above were only due to it being a later gathered gall. The typical *Andricus* is undoubtedly a different species from *A. quadrilineatus*. It certainly is possible, but is not probable, that two undoubtedly distinct insects should be bred from exactly the same species of gall from the same part of the tree of which the species is already known. We must leave it to time to clear up this difficulty, and so let both species remain at present, for I have no grounds for doubting the accuracy of the late Senator v. Heyden. The types of *A. pedunculi* are before me: they consist of a gall

and an insect on the same card, from v. Heyden's collection. The gall agrees exactly with those specimens of *A. flavicornis* which have narrow deep depressions between the ribs instead of the furrows. The *Andricus* (a female) is undoubtedly distinct, according to Prof. Schenck's description; but I have myself found no difference, notwithstanding a detailed examination; so will begin with Prof. Schenck's description, that the antennæ of the female of *A. pedunculi* are 14-jointed, whilst in *A. flavicornis* they are 13-jointed; however the former species has only 13-jointed antennæ. The thorax and abdomen, according to Schenck, are black in *A. pedunculi*, however they are coloured, just as in *A. flavicornis*. He says the scutellum is more or less pointed at the apex; however the typical specimen only shows at the most an undoubted partial enlargement of a fold, which is quite immaterial. There is, then, no difference either between the gall or the insect of the two species, *A. pedunculi* and *A. flavicornis*, so that I can accept them as distinct; but the name *A. pedunculi* must be retained, as Schenck has described this species first. Of *A. ambiguus* the gall only is known. Prof. Schenck was so friendly as to send me the types, which do not differ essentially from the other galls here described, with the exception perhaps that they are still red in colour, are both immature, and have altogether a fresher appearance. One specimen is altogether in accordance with the description given by Schenck, in that it is more nearly spherical, and is furnished with irregular, undulatory, narrow and sharp longitudinal striations; it is, however, more immature than the second specimen, which has thick, swollen, regular, straight striations, with narrow furrows between them, but it has also a stretched-out form. Of *A. glabriusculus* the gall only is also known: the five types from which it is described, from Von Heyden's collection, are before me. Two specimens agree perfectly with the galls of *A. quadrilineatus* and *A. pedunculi*; of a third specimen there is hardly anything but the inner gall existing, the greater part of the gall substance having gone. Two specimens are more clearly distinguished; they have only fine, irregular, faintly raised ribs, which run in a longitudinal and oblique direction, so that these specimens come very near to the next species (*A. verrucosus*), although that is described as doubtfully distinct. The galls collected by me from *Quercus pedunculata* (mentioned above) I cannot assign to any other species than *A. quadrilineatus*, Hart., or *A. pedunculi*, Schenck,

until I have succeeded in breeding the gall-flies. The galls were found in May, and were then, in the fresh state, succulent, as yet exhibiting no ribs; but in a few days partly shallow, partly deeper, longitudinal furrows were developed. They have now the same various appearances as the Schenckian types.—G. L. MAYR.

These galls are, I believe, common, and generally distributed in Britain, but unnoticed. Dr. Traill has found them in several localities in Scotland; and I have met with them in widely separated districts in Essex. Unless careful, we here get into great confusion of nomenclature. Like our common currant gall of the oak (*S. baccarum*) there are two forms of this species—the leaf form, and the catkin form. The description of the former has already been translated as a distinct species (*Aphilothrix marginalis*, Schlecht., Entom. x. 298); and of the latter, from above, we see how many are the varieties, which they certainly are, as is also doubtless the species next described. Of these the two chosen names of Schenck appear unfortunately to be *A. pedunculi* and *A. verrucosus*. *Pedunculi* was applied by Linné to the catkin form of *S. baccarum*; and *S. verrucosa* of Schlechtendal, a very distinct species, is described in the 'Entomologist' (Entom. x. 249). It is, therefore, certainly not only convenient, but necessary, that these two names, applied to the galls now under consideration, should be dropped, and that this species should be known as *Andricus quadrilineatus*, Hart., only. From these galls I have bred *Callimome auratus*, Fonsc., a species of *Pteromalus*; and one specimen of another unknown *Chalcid*.—E. A. FITCH.

86. *Andricus verrucosus*, Schenck.—The typical gall, from Von Heyden's collection, is brown, oviform, with a longitudinal diameter of 5·2 millimetres, and a horizontal one of 3·5 millimetres; its surface exhibits wide, separate, soft, rather indistinct, slightly raised, longitudinal striations and irregularly placed warts; its apex bears a prominent papilla; it occurs on the catkin stalk, and the remains of the perianth and anthers may sometimes be recognised at the base. Whether this gall belongs to a distinct species, or is only that of *A. quadrilineatus* or *A. pedunculi*, modified by *Synergi*, is doubtful, for a *Synergus* only was bred from it.—G. L. MAYR.

Doubtless a variety of the former species. I do not find that Dr. Mayr has named the above-mentioned *Synergus*, or again referred to it.—E. A. FITCH.

NOTES FROM UTAH.

By the late ANDREW MURRAY, F.L.S.

[THE accompanying notes, of a few points of insect life round Salt Lake City, are taken from one of the letters written home by Mr. Andrew Murray during his Californian expedition in 1873, and will probably be read with interest by others, besides the friend and fellow-worker in his special field of Economic Entomology to whom they were originally sent, although merely slight observations (jotted down without any view to publication) of such matters as caught his attention in the intervals of business. The alteration of the climate by irrigation, and the, apparently, consequent attack of the sage-brush by gall insects, was a subject in which he took much interest, from its possible economic results eventually on the vast tracts useless, or almost useless, from the presence of the *Artemisia*. Of these galls he brought home many specimens, of which the different kinds are now represented in the economic collection at Bethnal Green.]

Of insects one of the most interesting is the large, black, slightly bronzy cricket, on which the Indians used to feed, and which nearly destroyed the early crops of the first settlers.

The beetles are mainly of the Europeo-Asiat. American type, very much like our own. I have three or four specimens of a *Carabus*, like *C. campestris*. On the margins of the streams plenty of *Peryphus*, *Bembidium*, and their congeners; but there is one difference in the largest *Bembidium*. With us they run with great swiftness in the hot sun; but this species on the smallest provocation opens its wings like a *Cicindela*, and flies off. It seems only to make a little flight, but I have never been able to see one alight. The *Cicindelas* in the warm days in the glens are in great numbers, but fly off so quickly that I have only got one or two: most of them are the common Eastern species, *C. repanda*. A slight element of Californian species shows itself:—a *Cremastocheilus*, two or three *Eleodes*, &c.; only one *Curculio*; two *Elaters*; and a fine burying beetle, like a magnified *N. vestigator*. There are plenty of dead mules and dead cattle, but they set fire to them here; and almost every little patch of cow-dung in the pasture has also been fired.

The butterflies are not numerous in species, but in the canons are tolerably plentiful in individuals. The commonest seems a small skipper, which I have not yet caught. Then the American variety of our Camberwell Beauty is next: it is very beautiful on the wing, and is so strong and solid and big that whether in passing you or in touching it, as in knocking it down, it feels more like a bird than a fragile butterfly; it has a way, too, of soaring or gliding about like a hawk or a swallow, that is, bird-like, although it lirts about, too, like other butterflies. Then there is a white, which I have not caught, but which I think will turn out to be a *Hipparchia*, like *H. Galathea*; one or two *Argynnis*; and an American species, which I recollect by head-mark, but not by name.

The poplars, or cotton-woods, in the streets, are terribly mangled by a *Cossus*: its holes are just like those of our own *Ligniperda*; but its chrysalids, of which the remains stand still sticking out of the holes, are more like those of the leopard-moth in size and appearance. The cotton-wood is a poplar with a white bark and a sharp brown bud; that is all I can say yet. I picked a twig two days ago with the ring of eggs of the lackey-moth round it, exactly like our own; and to-day on opening the bag, in which I had put it, I find the caterpillars had begun to come out,—little black, tiny things, like our own. It is a different species I know, from memory, but I forget its name.

Galls are numerous on the oak (a low-growing scrub-oak, called the burr-oak); even although leafless I have found three galls still lingering, two on the branchlets and a third in the axils of the buds and leaves; and I observe, both on these and on injured twigs of cotton-wood, and by the way-side, that the infested and injured twigs continue to bear the remains of their leaves while the normal twigs are leafless. The sage-brush (*Artemisia* ? sp.) carries three galls. I think it is chiefly so affected in the neighbourhood of this city. There are three kinds:—one, the common sage-brush, that cattle will only eat in the last extremity, but which still keeps them alive; another kind, called white sage, which they like better, and on which they fatten; and a third. The reason of the prevalence of galls on it here (if it is really as it seems to me) may be that the plants are not thriving,—suffering from the improvement of the climate; for it seems that the cultivation and irrigation are producing a change in the climate. A brick-maker told me that “adobes,” or sun-dried bricks, could be made and used ten years ago when he

came; now they did not answer. The climate, too, was less severe in winter; rain had now begun to fall occasionally in summer; when he came there were no dews, now there are; while fifty to a hundred miles to the south beyond the settlement there is no dew yet.*

Salt Lake City, April 22, 1873.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

VANESSA ANTIOPA AT KEYMER.—*Vanessa Antiopa* was captured at Keymer, Sussex, by Robert Chatfield, on April 28th last. There is only one other recorded instance of this species having been seen there. This is evidently a hibernated specimen, and is a little worn.—M. CLIVE-BAYLEY; 56, Portland Place, London, W.

COLIAS EDUSA HYBERNATING AS A LARVA.—As a contribution to the life-history of this butterfly I will relate my experience during last winter. I had some larvæ, which were hatched in September. These fed all through the winter, except when very cold, when they became quite torpid, and seemed to be almost frozen. I started with thirteen, but these gradually died off; so that in February I was left with three in their last moult, and two small ones. Some thief of a bird, either a robin or a wren, got through a broken pane, and stole the three large ones at one time. I was then left with the small ones only, one of which unfortunately died; but the other fed on, and changed to a pupa on April 11th. On May 2nd this produced a fine female imago; so it was but twenty-one days in the penultimate state.—H. JOBSON; 7, Reform Terrace, Park Lane, Tottenham, May, 1878.

COLIAS EDUSA IN SPRING.—I have to record that three specimens of *Colias Edusa* were seen flying, on April 22nd, by Mr. W. H. Liversidge, while driving near Ryde. Does not this argue that the insect does hibernate as an imago, whatever it may do in the larva state?—COLLIS WILLMOTT; 194, Mare Street, Hackney, April 29, 1878.

[Briefly referred to in last number.—E.D.]

* The "Reports on the Zoological Collections of Lieut. W. L. Carpenter, made in Colorado during the summer of 1873" (Washington, 1875), goes rather fully into the insect fauna of this district. Baron C. R. Osten Sacken, who notices the galls, refers to three species of oak-galls: some *Nematus* galls on willows; a species of gall formed by *Aphides* (*Pemphigus*) on the leaf-stalk of the cotton-wood, and from the pupa-shells, found inside the sage-brush galls, he refers the gall-maker to the genus *Trypeta*.—E. A. F.

COLIAS EDUSA IN MAY.—On Saturday, May 18th, I was walking up the Finchley Road, near Platt's Lane, when a fine *Colias Edusa* flew across the road within five yards of me. Shortly afterwards two more (apparently females) passed me; and later on in the day, between four and five p.m., I saw two others in a field, near the Willesden Lane.—R. T. GIBBONS; Chilton Villa, Loveridge Road, Kilburn, N.W., May 23, 1878.

FOOD-PLANTS OF GONEPTERYX RHAMNI.—In the 'Entomologist' for July, 1875 (Entom. viii. 160), there appeared a communication from me, wherein I stated that *Gonepteryx rhamni* had been reared from eggs deposited on "a scrubby *Alaternus*" growing in my garden. The shrub in question, having been invoiced to me under that name from a well-known nursery, I did not doubt the correctness of it until lately. On sending a piece, however to the garden department of the 'Field,' it was identified as *Maytenus Chilensis*. On looking it up I find that the genus *Maytenus* is closely allied to *Rhamnus*, especially to *R. alaternus* (which last species, by the way, I am told has been lately placed in a separate genus). *M. Chilensis* bears, in April or May (according to the season), a profusion of small greenish flowers having a strong perfume, which, although not particularly sweet, seems to have a strong attraction for insects, and most probably first drew the attention of the butterfly. Larvæ have been found on it every year since, and now there are several eggs waiting to be hatched.—N. C. TUELY; Mortimer Lodge, Wimbledon Park, S.W., May 6, 1878.

LEPIDOPTERA IN NORTH WALES.—On the 2nd of May I was working for Lepidoptera in the woods about Llanrwst, and was astonished to see *Lycæna Argiolus* in abundance. By throwing stones at the holly bushes (which grow here to an immense height) I was enabled to induce the butterflies to make a descent. Owing to the difficulties of the situation I could only manage to secure eight females and one male, but must have missed quite a score more. I took also *Tephrosia biundularia*, at rest, on the larch; but owing to the north-east winds, which continued over a week, nothing else worth mention turned up.—S. D. BAIRSTOW; Woodland Mount, Huddersfield, May 12, 1878.

ACHERONTIA ATROPOS IN NORTH IRELAND.—A friend of mine has to-day brought me a remarkably fine specimen of *Acherontia Atropos*, which he caught yesterday near the sea-

shore, at rest, on a piece of wood.—T. BRUNTON; Glenarm Castle, Co. Antrim, N. Ireland, May 9, 1878.

ACHERONTIA ATROPOS AND DEIOPEIA PULCHELLA IN DEVON.—I think the following two captures by one individual in one week during this month worthy of record, viz.—on May 6th a very good specimen of *Acherontia Atropos* was found; on May 11th was captured an example of *Deiopeia pulchella*, which was slightly worn, but otherwise in a good state of preservation, and now in my possession. Both were taken on the South Devon coast by a gentleman's servant, who, although no entomologist, was struck by their appearance; and he says that the former cried like a child. I may add that in September, 1875, I was fortunate enough to procure seven specimens of *D. pulchella* in this same locality.—ARTHUR H. WALKER; Southgate, Middlesex, May 22, 1878.

ACRONYCTA ALNI.—I have bred two splendid specimens of this rarity from larvæ beaten from oak in Kent, last August.—WM. MACHIN; 22, Argyle Road, Carlton Square, E., May 23, 1878.

DESCRIPTION OF THE LARVA OF NOCTUA DITRAPEZIUM.—On the 19th of May, 1877, I received larvæ of this species from Mr. T. W. Salvage, of Brighton. Length about an inch and a quarter, and tolerably stout in proportion. Head polished; it has the lobes rounded, and is narrower than the 2nd segment. Body cylindrical and of nearly uniform width throughout, only tapering slightly towards the head; segmental divisions distinct, but not deeply notched; skin soft and smooth, having very few, almost imperceptible, short hairs. The ground colour is of various shades of ochreous-brown; in some being almost yellowish, in others of a strong purplish tinge; in all cases on the centre of the dorsal area the ground colour is almost obliterated by a series of large, lozenge-shaped, dark brown blotches, one on each segment; this dark brown colour is also suffused along the sides, a series of still darker oblique marks, one extending upwards and forwards from each spiracle, being very noticeable. Head yellowish brown, with a very dark brown stripe extending from the summit of each lobe to the mandibles. A very fine pale gray line, extending through the lozenge-shaped marks, forms the dorsal stripe; along the subdorsal region is a series of short black stripes, becoming more conspicuous towards the posterior extremity, and forming on the 12th segment two distinct attenuated triangular marks, the apex of each pointed anteriorly, and joined at their bases by a transverse black

stripe, edged outwardly with bright yellow; spiracles conspicuous, oblong, yellowish white. The ventral surface varies according to the colour of the dorsal area, being almost uniformly dull pale ochreous, or purplish, as the case may be. Feeds on birch, and in a state of nature probably also on various low plants.—GEO. T. PORRITT; Highroyd House, Huddersfield, May 16th, 1878.

ANARTA MYRTILLI IN APRIL.—I took on April 18th a fine specimen of *Anarta myrtilli*. Is not this unusually early? Stainton's Manual and other books give it as flying in June or July. It is too fresh and bright to be a hybernated specimen; and it is undoubtedly *A. myrtilli*.—E. CROSS; Appleby Vicarage, Brigg, Lincolnshire, April 28, 1878.

HELIODES ARBUTI NEAR LONDON.—During the present week I have been taking several specimens of *Heliodes arbuti* in a meadow here, within five miles of the metropolis. This is, I believe, a new locality for this pretty species. They seem to keep to one corner of the field, flying about whenever the sun is shining. I may mention that in the field chickweed, on which the caterpillar is said to feed, is particularly abundant here.—N. C. GRAHAM; Silwood, Tulse Hill, London, S.W., May 7, 1878.

XYLOMIGES CONSPICILLARIS.—While strolling along the road from Dartford to Darenth, on the 27th of last month, I found two specimens of this rare species, one on a post, the other on a fence, close to the Gore Farm. I have searched for this insect sixteen or seventeen years, but never saw it alive before. Imagine my surprise at finding two in less than twenty minutes.—E. G. MEEK; 56, Brompton Road, S.W., May 13, 1878.

XYLOMIGES CONSPICILLARIS.—On April 23rd last, whilst collecting in the neighbourhood of Dartford, Kent, I had the good fortune to capture a fine male *Xylomiges conspicillaris*. I found it on a fence, near a large clover field. Mr. H. Packman, of Dartford, captured one on April 27th. This specimen is also in fine condition.—EDWARD R. SHEPPARD; 13, Limes Villas, Lewisham, Kent, May 14, 1878.

THERA VARIATA.—I have just been looking at a pupa of *Thera variata*, and to my surprise found it had all the lines, as seen on the larva, well defined on the pupa. Are there any other pupæ that bear the markings of the larvæ?—G. C. BIGNELL; Clarence Place, Stonehouse, Plymouth, May 18, 1878.

CAPTURES AT EPPING FOREST.—On the Saturday after

Easter Monday I went to the forest in the hope of again taking *Perittia obscuripunctella* and *Chrysocoris festaliella*. but the wind being northerly nothing would move, except two or three wasted *Anticlea derivata*. After working for some time in vain I turned my attention to the thistle-stems, and secured a good supply of the pupæ of *Ephippiphora pflugiana*; and on my way back to Chingsford Station I examined the plants of stitchwort (*Stellaria holostea*), common in the hedges. These produced *Coleophora solitariella* in plenty, nearly full-fed. On a subsequent visit to the forest I met with the following:—*Elachista obscurella*, *Perittia obscuripunctella*, *Grapholita obtusana*, *Stigmonota puncticostana*, *Lobesia reliquana*, and *Dicrorampa plumbana*; *Pyrodes rhediana* were common. The grandest capture was a splendid specimen of *Ephippiphora obscurana*, beaten from hawthorn. I have bred *Gelechia acuminatella* in profusion from larvæ, found in October last, mining the leaves of thistles, on Hackney marshes. Two larvæ found on the same plants, and which hybernated, have now produced *Noctua rubi*.—WM. MACHIN; 22, Argyle Road, Carlton Square, E., May 23, 1878.

ENTOMOLOGY AT THE ROYAL ACADEMY.—It is, we conceive, a thing to rejoice over, when a master of acknowledged standing in the highest walks of art—a learned, thoughtful, austere, and thoroughly academical painter—condescends to execute a designedly and deliberately comic picture. This is what Mr. E. Armitage, R.A., has done in his genial and playfully humorous work—(111) “An Entomological Sale.” The more classical painters who occasionally unbend, the merrier. One of the most irresistibly funny collections of caricatures extant is that engraved by Wenceslaus Hollar, from the pen-and-ink drawings of Lionardo da Vinci. John Leech, Richard Doyle, Hablot Browne, never drew such funny faces as those traced by the immortal painter of the “Cena;” and here we have the grave and dignified Mr. Armitage giving us the humours of an auction of a choice collection of insects, and constructing a genuine comedy which H. J. Byrons might prize and J. L. Tooles adore. Never mind if the old gentlemen who are poring over the “lots” are “beetle-stickers” and “butterfly-butchers.” They are aware of what they are about; they know their Kirby and Spence by heart; they can afford to meet with a cheerful smile the sneers which are occasionally levelled at the pursuit of the science of Entomology; and they hold with the sage that

insects are thoroughly worthy of the deepest study, inasmuch as they are "Nature's favourite productions, in which, to manifest her power and skill, she has combined all that is either beautiful and graceful, interesting and alluring, or curious and singular, in any class of her children." All honour, then, to Mr. Armitage's knot of eccentrics, whose vocation and delight it is to collect specimens of the wonderful little creatures that leap, that run, that fly, that walk, that bore into the ground, that drive galleries through timber, that disport themselves in the air or gambol in the water, that gleam with phosphorescent radiance, that furnish us with silk, honey, wax, and lac, that build structures more marvellous than the pyramids, and that can upon occasion defend themselves stoutly, and, with poisoned weapons, resent the outrages of the tyrant Man. What is he, after all, with his two eyes and two legs, when yonder tiny thing, crawling on the rim of a wine-glass, has eyes by octaves and legs by the dozen? Mr. Armitage's whole picture, with its quaint motto, "Beati Possidentes," is replete with qualities of quaintness and sober drollery; and the entomological specimens on the auction room table, with the other details, down to the matches "warranted only to light on the box," are most dexterously and effectively rendered.—'Daily Telegraph,' May 18, 1878.

ANSWERS TO CORRESPONDENTS.

SPHINX LIGUSTRI.—Does the larva of *Sphinx ligustri* change its skin only once? I see by 'Larvæ of the British Lepidoptera, and their Food-plants' (part 1, p. xxiv of the Introduction), by Owen S. Wilson:—"Some lepidopterous larvæ change their skins many times, others but few, *Sphinx ligustri* but once;" and by the plates some of the *Sphingidæ* have the horn on the 12th, but most of them have it on the 13th segment, and many of them have fourteen segments. Is this correct? I was taught by an old entomologist that all larvæ had thirteen segments, the head always considered the 1st.—W. CONDY; Laira, May 18, 1878.

[Newport, quoted by Packard, 'Guide to the Study of Insects' (p. 63), states that the larva of *Sphinx ligustri* moults six times. The body of the larvæ of Lepidoptera consists of thirteen segments, counting the head as one; never, I believe, of fourteen. In the larvæ of the *Sphingidæ* the horn, when present, is on the 12th segment.—ED.]

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DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from p. 136.)



Fig. 87.—Galls of *Andricus Schlechtendali* of the natural size on the catkin, and magnified.

87. *Neuroterus Schlechtendali*, Mayr (*Andricus burgundus*, Schlechtendal).—This very small gall is to be found in May, during the blooming time of the oak, on the catkins of *Quercus sessiliflora*, *Q. pedunculata*, and *Q. pubescens*. It consists of a greenish yellow swelling of the stamen and connective, in such a manner that the divisions of the bloom become more crowded below, less above, or not separated. The stamen mostly attains to a diameter of 1 millimetre, or somewhat over; the chamber is, in the mature gall, surrounded by a moderately hard shell, as an inner gall, on which the succulent part of the gall lies after withering. After the general fall of the catkins, when their stalks become quite withered, some generally remain on the tree: it is on these that many examples of this gall, which are still green, are to be found; and it is about this time that the galls themselves fall to the earth, so that if we now shake a tree

bearing these galls they fall in immense quantities. On May 22nd and 25th of this year (1871) I found the galls in great numbers near Vienna, mostly on *Q. pubescens*. Several times I found the galls of *N. Schlechtendali* and *Andricus amenti* together, on the same catkin. Herr v. Schlechtendal found the galls on May 7th, 1869. He kept them on wet sand, and obtained the small gallflies on July 28th of the following year.—G. L. MAYR.

This inconspicuous little catkin gall has not been recorded as British. Probably it occurs here, but has been overlooked.—E. A. FITCH.



Fig. 88.—Galls of ? *Cynips seminationis*. Fig. 88A. Of ? *C. inflorescentiae*.

88. ? *Cynips seminationis*, Gir. (? *Cynips inflorescentiae*, Schlechtendal).—This gall, which, according to Dr. Giraud, is to be found on *Quercus pedunculata*, and bears a great resemblance to the gall of *Aphilothrix callidoma*, occurs on a catkin with a thickened stalk. It is of about the size of a barley-corn, or slightly smaller, spindle-shaped, pedunculated or sessile, and covered with few or many more or less sharply defined, often quite indistinct, longitudinal ribs. The green, later brown, often (as *C. inflorescentiae*) bearing red longitudinal striations, gall is covered with deflected, light, short, scattered hairs, and bears a papilla at the apex; at the base it is encircled with a dense wreath of hairs. According to Dr. Giraud the gall falls in the latter half of May. The gall-fly is quite unknown.—G. L. MAYR.

From Dr. Giraud's description this appears to be a form of the rather variable gall of *Aphilothrix callidoma*, Hart. (Entom. viii, 290), but can be referred to no species with

certainly, as the *Cynips* has not been bred. According to Dr. Mayr a female of *Synergus albipes*; Hart., and *S. facialis*, Hart., have been bred from these galls at the end of July of the same year.—E. A. FITCH.

COLLECTED OBSERVATIONS ON BRITISH SAWFLIES.

By the late EDWARD NEWMAN.

(Continued from p. 91.)

PROCEED we now to distribute the Hymenoptera, to which the sawflies undoubtedly belong. The grand divisions are four, as usual; and these are dependent on food and economy. There are various classifications of this interesting group, all more or less dependent on that character; so that the task of distribution is comparatively easy. However different our systems may appear on paper, there is evinced a concurrent disposition to employ these as the leading principles; and Nature, the great mistress and teacher in the matter, appears to have marked them with unmistakable clearness.

Pædotropha, in which the eggs are generally laid in cells prepared for their reception. When the larva emerges it is fed by the parents; mouthful after mouthful is brought to it, and placed in the mouth of the young one, who is as helpless as an infant. All these have three sexes. *Proctotropha*, which store up insects of all kinds, also for the food of their young. It is said that these poor creatures receive a sting from the parent at the time of incarceration, and that this deprives them of all muscular power. Although these poor prisoners remain dormant, yet they are not absolutely dead; at least the prey remains perfectly fresh until required for the food of the larvæ.

3. *Biophaga*, which, in the larva state, live entirely on the living fluids of other insects, feeding until the skin, or exoskeleton, remains a shrivelled and empty sack; it then sometimes emerges to undergo its transformation to a pupa; but this change more frequently takes place inside of the skin. This may be truly said to be feeding on life.

4. *Phytophaga*, which eat nothing but plants, generally the tissue only of the leaves, but sometimes also the pith and solid wood.

These, however, require a rather more detailed description.

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This inconspicuous little catkin gall has not been recorded as British. Probably it occurs here, but has been overlooked.—E. A. FITCH.



Fig. 88.—Galls of ? *Cynips seminationis*. Fig. 88A. Of ? *C. inflorescentiae*.

88. ? *Cynips seminationis*, Gir. (? *Cynips inflorescentiae* Schlechtendal).—This gall, which, according to Dr. Giraud is to be found on *Quercus pedunculata*, and bears a great resemblance to the gall of *Aphilothrix callidoma*, occurs on a catkin with a thickened stalk. It is of about the size of a barley-corn, or slightly smaller, spindle-shaped, pedunculated or sessile, and covered with few or many more or less sharply defined, often quite indistinct, longitudinal ribs. The green, later brown, often (as *C. inflorescentiae*) bearing red longitudinal striations, gall is covered with deflected, light, short, scattered hairs, and bears a papilla at the apex; at the base it is encircled with a dense wreath of hairs. According to Dr. Giraud the gall falls in the latter half of May. The gall-fly is quite unknown.—G. L. MAYR.

From Dr. Giraud's description this appears to be a form of the rather variable gall of *Aphilothrix callidoma*, Hart. (Entom. viii, 290), but can be referred to no species with

certainly, as the *Cynips* has not been bred. According to Dr. Mayr a female of *Synergus albipes*; Hart., and *S. facialis*, Hart., have been bred from these galls at the end of July of the same year.—E. A. FITCH.

COLLECTED OBSERVATIONS ON BRITISH SAWFLIES.

By the late EDWARD NEWMAN.

(Continued from p. 91.)

PROCEED we now to distribute the Hymenoptera, to which the sawflies undoubtedly belong. The grand divisions are four, as usual; and these are dependent on food and economy. There are various classifications of this interesting group, all more or less dependent on that character; so that the task of distribution is comparatively easy. However different our systems may appear on paper, there is evinced a concurrent disposition to employ these as the leading principles; and Nature, the great mistress and teacher in the matter, appears to have marked them with unmistakable clearness.

1. *Pædotropha*, in which the eggs are generally laid in cells prepared for their reception. When the larva emerges it is fed by the parents; mouthful after mouthful is brought as required, and placed in the mouth of the young one, which is helpless as an infant. All these have three sexes.

2. *Creophaga*, which store up insects of all kinds, also spiders, for the food of their young. It is said that these poor creatures receive a sting from the parent at the time of incarceration, and that this deprives them of all muscular power. Although these poor prisoners remain dormant, yet they are not absolutely dead; at least the prey remains perfectly fresh until required for the food of the larvæ.

3. *Biophaga*, which, in the larva state, live entirely on the living fluids of other insects, feeding until the skin, or exoskeleton, remains a shrivelled and empty sack; it then sometimes emerges to undergo its transformation to a pupa; but this change more frequently takes place inside of the skin. This may be truly said to be feeding on life.

4. *Phytophaga*, which eat nothing but plants, generally the tissue only of the leaves, but sometimes also the pith and solid wood.

These, however, require a rather more detailed description.

1. The *Pædotropha*, or children-nurses. Sociality is the general attribute of this group—bees, wasps, and ants. The young are invariably apod. The food supplied by the parents is principally the honey of flowers, and the honey-dew secreted, or supposed to be secreted, by plant-lice. St. Fargeau informs us that the young of wasps are fed with particles of more solid food, and that whenever the feeder appears they open and shut their mouths, like young birds gaping for a grub when brought by their parents. This is by no means the case concerning the bee, for, though fed, the feeder and the fed generally exhibit great affection for one another, though perhaps a kind of cupboard-love. The colony consists of three kinds of individuals—male, female, and neuter. The neuters do the work of the colony: build the hive, feed the young, and make themselves generally useful. It may be stated that they sometimes take the management of the community into their own hands; for DeGeer tells us of the ants, that they have been seen to kill and devour the babies: this may arise from the difficulty of procuring food for them. This same operation takes place also with the hive-bee in the destruction of the drone. The females and neuters are provided with stings, which seem for this purpose only; at least they are very inefficacious as weapons of either defence or offence. Three natural orders comprising this family build those remarkable cells which have excited the wonder and admiration of all; and these architectural powers are abundant sources of speculation. Imaginative and florid writers have invested the subject with an interest that makes it so; for the same phenomena take place in hexagonal crystals, in basaltic columns, in the facets of an insect's eye, and in a hundred different circumstances, in which the will or instinct, or contrivance or foresight, of the substance cannot possibly have been brought into play. It is desirable that writers on Natural History should direct their flow of glowing sentences to the wonders thickly scattered around them, and which are unmistakable, rather than create wonders out of the most commonplace occurrences which can possibly attract the notice of the uninitiated. The fact of a chicken being hatched by the simple process of incubation is far more wonderful than that ordinary caterpillars should be arrayed as moths. The latter fact is always noticed as remarkable, while the former invariably remains unnoticed. In this order the hexagonal cell is of frequent recurrence; but we must not lay too much

stress on these hexagons, as exhibiting instinct in the fabricator, though no doubt the instinct is clearly displayed, as in all insect operations, but we certainly are aware that the cells have to be constructed as closely approximate as possible, not only to economise space and material, but also because each cell is thus compelled to give six others the greatest amount of support; thus strength, economy of material, and economy of space and time are attained in the highest degree. The more salient groups of the *Pædotropha* are the *Apidæ*, *Andrenidæ*, *Vespidæ*, and *Formicidæ*. They are the most prominent at present for their habits and economy.

2. The *Creophaga*, which store up insects of all kinds as food for their young. They differ from the *Pædotropha* in abandoning their progeny, being satisfied that they will find out and appropriate the food provided for them. The food consists of spiders, grasshoppers, cockroaches, flies of all kinds, caterpillars, and occasionally the imagos of Lepidoptera. These creatures appear to be still living with the parent *Creophagan*, but to have been stung, and thus rendered numb and helpless. The stings of this order seem to possess the power of reducing the victim to a semi-torpid state, in which we may hope they remain without sensation; for from this time forward they have neither food, light, nor liberty, but remain in a perfectly helpless state, until required for the food of the *Creophagan*.

3. The *Biophaga*, or those which, in the larva state, are imprisoned in the bodies of living insects, on whose flesh they feed during the whole of their larval existence, until their victim is shrivelled and reduced to a mere skin, and yet retains a languid animation. The *Biophagan* may be supposed instinctively to avoid the vital parts of its prey, since, by destroying life, it would induce its own death; it is essential to the well-being of the *Biophagan* that its prey should retain life as long as its own life and appetite endured. It generally leaves its victim before life is entirely extinct, and, spinning its cocoon on the exterior, in due time undergoes its final change to lay its egg on another victim, and thus inaugurate another cycle of cruelty and rapine.

It is impossible to meditate on these details and not to rejoice in the belief that the victims of this treatment are not, like ourselves, sensitive to pain; indeed, there are many circumstances connected with the inquiry that lead to this conclusion: it would be horrible to suppose that millions

upon millions of beings were annually born to feed parasites that are ever feeding on their living flesh.

From the observations in Kirby and Spence it will be seen that those far-seeing naturalists viewed this matter in an entirely different light; they simply regarded the phenomena from a utilitarian point of view. I will quote the passage entire, since it illustrates my theme, although I can by no means concur in the moral drawn from the facts. "From the observations hitherto made by entomologists the great body of the ichneumon tribe is principally employed in keeping within their proper limits the infinite host of lepidopterous larvæ, destroying, however, many insects of other orders; and perhaps if the larvæ of these last fell equally under our observation with those of the former we might discover that few exist uninfested by their appropriate parasite. Such is the activity and address of the Ichneumonidans, and their minute allies the *Pupivora*, that scarcely any concealment, excepting perhaps the water, can secure their prey from them, and neither bulk, courage, nor ferocity, avail to terrify them from effecting their purpose. They attack the ruthless spider in his toils; they discover the retreat of the little bee that for safety bores deep into timber; and though its enemy Ichneumon cannot enter its cell, by means of her long ovipositor she reaches the helpless grub which its parent vainly thought secured from every foe, and deposits in it an egg, which produces a larva that destroys it. In vain does the destructive *Cecidomyia* of the wheat conceal its larvæ within the glumes that so closely cover the grain: three species of these minute benefactors, sent in mercy by Heaven, know how to introduce their eggs into them, thus preventing the mischief which they would otherwise occasion, and saving mankind from the horrors of famine. In vain also the *Cynips*, by its magic touch, produces the curious excrescences on various trees and plants, called galls, for the nutriment and defence of its progeny. The parasite species attached to it discovers its secret chamber, pierces its wall, however thick, and commits the destroying egg to its offspring. Even the clover-weevil is not secure within the legumen of that plant, nor the wireworm in the earth, from their ichneumonidan foes. Others are not more secured by the repulsive nature of the substance they inhabit; for two species at least of Ichneumon know how to oviposit in stercorarious larvæ without soiling their wings or bodies."—*Introduction to Entomology*, i. 267.

I have named the group *Biophaga*, or life-eaters, because I thought that name more truthful, descriptive, and emphatic, than those hitherto employed,—*Entomophaga*, *Isophaga*, *Parasita*, *Eunivora*, *Pupivora*, *Pupophaga*, &c. The *Evaniidæ*, *Ichneumonidæ*, *Chalcididæ*, and *Proctotrupidæ*, are generally esteemed the principal families of this order. This is a much more extensive group than is generally supposed. We are too apt to regard Ichneumons as a large tribe of insects associated from their propensity to live parasitically on the caterpillars of butterflies and moths; but this scarcely gives a sufficiently comprehensive idea of the phenomena. Prof. Westwood, in that vast repertory of entomological facts,—which requires an index,—‘Introduction to the Modern Classification of Insects,’ has collected from a variety of authentic sources a vast amount of information which widely extends our views of these Biophagans, and shows that scarcely an insect is secure from their attack. I will enumerate a few of these instances.

Octopoda.—Several spiders are subject to this plague: the beautifully silk-like egg-nests of many spiders are attacked in this way, and the eggs thus prevented from coming to maturity. Indeed one species of Biophagan is so well known for its ravages on the spider-world that it has received the name of *Ichneumon araneorum*.*

Hexapoda.—In Lepidoptera the liability to parasites is the rule, its absence the exception. In Diptera I have observed the frequent occurrence of hyperparasitism, that is when the fly has deposited its egg on or in the larva of a Lepidopteron: the larva proceeding from that egg has become the prey of a Biophagan, and thus the original life has been forfeited; the life of the dipterous destroyer has also been forfeited; and the destroyer of the destroyer, or the hyperparasite, has been the only life to escape. As an example I may state the common woolly-bear, the larva of *Chelonia cava*, feeds a host of these Biophagans, not only direct parasites, or parasites which not only fulfil their murderous mission on the woolly-bear itself, but which nourished with their own living flesh hundreds of minute Biophagans; so that the bear and its parasites alike perish under the terrible infliction of these almost invisible murderers. Some even go farther than this: they pierce the eggs of Lepidoptera with their ovipositor, and fill these eggs with their ravenous progeny. In a word, this parasitism is so

* *Ichneumon araneorum*, Fourc., is *Pezomachus zonatus*, Först.

common among butterflies and moths that I know not a single species that escapes it altogether. *Papilio Machaon* perhaps offers the nearest approach to immunity, for I have never bred more than two parasites from this noble butterfly. The Hymenoptera themselves are subject to the attacks of numerous parasites. There is one group whose parasites are of another class: these are the *Pædotropha*, or those which live in vast communities. These are preyed upon exclusively, as I believe, by Coleoptera, the genus *Rhipiphorus* and *Zenos* attacking the *Vespidæ*; *Horia*, *Sitaris*, *Melœ*, *Stylops*, *Eleucus*, *Hylecthrus*, and *Halictophagus*, being parasitic on solitary species. These I have elsewhere described as having a metamorphic larva: the first stage very slender, hexapod, and active; the second, obese, apod, and stationary. Most of the phytophagous Hymenoptera are subject to this plague: the common leathery cocoon of *Tenthredo cratægi*, often seen in abundance in our whitethorn hedges, is frequently stuffed to bursting with the larvæ of a Biophagan. In Coleoptera the instances of the parasitism of these Biophagans are by no means so numerous. *Timarcha tenebricosa* is subject to this plague, but never to any great extent. *Coccinella 7-punctata* has a similar enemy, and numerous *Rhynchophora* suffer from their attacks: the genera *Barynotus*, *Otiorhynchus*, and above all the quaint *Apions*, particularly *A. apricans*, the insect which I described elsewhere as so destructive to clover-seed. If you sweep the clover with a bag-net the proceeds will contain the *Apion* and a small *Pteromalus* in about equal numbers: and as for *Otiorhynchus sulcatus*, that inveterate enemy of green-house ferns; *O. notatus*, which infests the larch; and *O. scabrosus*, that plague of the rose grower—they are all subject to Biophagan assaults. So also are the various species of *Ptinidæ*; and these life-destroying creatures not only traverse our posts and rails, and fences and timber, out of doors, but enter our houses with the charitable intention of finding and destroying these boring creatures, while thinking themselves safe in their cylindrical galleries. The larvæ of *Mordellæ* and *Orchesiæ*—*Orchesia micans*—fall a prey to these parasites. On the Orthoptera the Biophagans make but little impression. The locusts which have devastated the Western States of America are infested by a Biophagan, but in such small numbers that it fails to make any impression on the multitudinous hosts of these destroyers. In Neuroptera a singular instance is given by Mr. Kirby

of a minute *Biophagan* being found on *Æschna viatica*; and Boudier has discovered one that attacks the ant-lion in his pitfall. This appears the most extraordinary instance of all. The ant-lion constructs its pitfall for the sole purpose of entrapping wandering and unwary flies that may chance to venture too near the brink of the treacherous precipice prepared for their destruction: and here we see a powerless insect boldly bearding the lion in his den; and by the insidious process of puncturing and depositing an egg that will hatch within his body and produce a grub that will, by slow degrees, consume his living flesh, avenging a whole legion of flies which have fallen victims to his rapacity. This is the most remarkable instance of all; and here I will draw the curtain over the harrowing scene.

Still another feature must be added to this sad story, that of eggs and egg-setting. Many of these *Biophaga* are so minute that they are born and pass through the state of egg, caterpillar, chrysalis, and imago, within the egg of a butterfly or moth. I have been told that hundreds of these minute creatures have been seen to issue from a single egg. Perhaps it was in reference to these wonders that Cowper wrote:—

“The shapely limb and lubricated joint
Within the small dimensions of a point,
Muscle and nerve miraculously spun
His mighty work, who speaks and it is done.”

4. The *Phytophaga*, which in the larval state feed entirely on plants. The families are *Tenthredinidæ*, *Xyelidæ*, *Siricidæ*, and *Cynipidæ*. Since it is compulsory that I should enter more fully into the details of this order in a future portion of this paper, I will not introduce them here. It is quite certain that as our philosophical knowledge of the *Hymenoptera* progresses, many, perhaps all, of the groups which I have called families will take the rank of natural orders.

Although the characters by which this plant-eating tribe seem so trenchant as to admit of neither difficulty nor confusion, yet we shall see that it is so comprehensive as to require subdivision within its own compass. Thus some may be denominated *Phyllophaga*, or leaf-eaters, from their larvæ eating the leaves only; others, *Myelophaga*, from a similar preference for the pith; a third order, *Xylophaga*, devour the solid wood; and a fourth have the singular economy of setting up a diseased action locally in the plant, and eat nothing but the abnormal productions which their attack has occasioned,—these are the *Nosophaga*, or *Cynipites*. To the

last of these belong the sawflies, a group of insects that seem isolated in a very remarkable manner, so much so indeed that our more philosophic and systematic entomologists exclude them from the Hymenoptera altogether. In the larva state they resemble Lepidoptera, in the pupa state they assimilate to Coleoptera, and the perfect insect is a complete Hymenopteron, possessed of most of the distinctive characters in a very marked degree, the wings being also extended.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. IX. NYMPHALIDÆ—HELICONINÆ.

IN structure the butterflies of this subfamily resemble the *Acræinæ*, and their larvæ are also spiny, but the palpi of the imago are clothed with fine scales, and hairy in front. Their closed wing-cells will prevent their being confounded with the typical *Nymphalinæ*, and their very long rounded wings separate them at a glance from nearly all other butterflies, except the *Danainæ*, which some of them mimic, but from which the simple submedian nervure of the fore wings will distinguish them. The subfamily, as at present constituted, includes but two genera, *Heliconius* and *Eueides*, the former of which may be known by its longer and slenderer antennæ, with a much more gradually formed club. All the species are tropical American.

The first section of *Heliconius* comprises black and fulvous species, spotted or banded with yellow, and frequently resembling *Tithorea*, *Lycorea*, *Melinæa*, &c., in markings. Some of these, such as *H. Eucrate*, have a conspicuous white spot in the broadly black tip of the fore wings. Another section is black, or bluish black, variously banded with white or yellow. Thus *H. Antiochus* has two narrow white bands on the fore wings; *H. Diotrephe* a very broad one; *H. Cydno* a broad yellow one on the fore wings, and a submarginal white band on the hind wings; and *H. Rhea*, and allies, a broad yellow band on the fore wings, and a narrower one towards the tip.

H. Charithonia, the commonest species in the West Indies, has two narrow yellow bands across the tip of the fore wings, and another running from the base, and curving

at about half its length towards the hinder angle, to which it nearly extends. There is a basal stripe on the hind wings, and an outer continuous row of spots. In *H. Atthis* the hind wings are similarly marked, but the outer spots are milk-white, and there is a short yellow basal stripe, with a broader transverse one at the extremity, beyond which are one or two white spots, and an outer row corresponding to that on the fore wings. I know of no genus which presents a greater variety, combined with so much uniformity, of both colour, marking, and pattern, as *Heliconius*.

One of the prettiest species is *H. Cyrbia*, which is dark blue, with a red transverse band on the fore wings, and the border of the hind wings spotted with white. A great number of the commonest and best-known species are black, red, and yellow. *H. Clysonymus* has an irregular transverse yellow band on the fore wings, and a broad red band on the hind wings. In *H. Phyllis*, and its allies, these colours are reversed, there being a red band on the fore wings and a yellow one on the hind wings, and sometimes a yellow basal streak on the fore wings also. *H. Erate* is remarkable for appearing under two forms in both sexes, which were naturally supposed to be two species, till Mr. Bates reared them both from the same larva. In both there is a large transverse cluster of yellow spots in the middle of the fore wings, and a band of four or five large spots across the tip; but in typical *Erate* the hind wings are rayed with red; and in *Doris* with greenish blue. Some forms, allied to *Melpomene*, in which there is a large red stripe across the fore wings, are marked with red only, being more or less banded, spotted, or rayed, on the fore or hind wings, or both; and *H. Thelxiope* is rayed with red on all the wings, but more or less spotted with yellow beyond the middle of the fore wings. *H. Ricini*, a species somewhat approaching *Eueides*, has a yellow band on the middle of the fore wings, and a smaller one towards the tip; the hind wings are red, with a broad black border.

The species of *Heliconius* measure from two to four inches in expanse; but those of *Eueides*, which, as we have said, may be known by the difference in their antennæ, rarely exceed two inches and a half. They are generally black and tawny, varied with dull yellow. The first group resembles *Heliconius Thelxiope* and allies, being black, veined with dull red, and spotted with dull yellow beyond, instead of sulphur-yellow. *E. Thales* may be considered as the representative of this group. Another group, of which *E. Lybia*

may be considered typical, is fulvous, with the borders broadly black, and a broad black band towards the tip of the fore wings. In *E. Olympia* the tip is broadly black, with a large white spot. In the last group, comprising *E. Cleobæa*, &c., which sometimes measures three inches across the wings, the species are banded and spotted with black and tawny, and with ochre-yellow beyond the middle of the fore wings, nearly as in *Lycorea* or *Melinæa*.

Fritz Müller has lately proposed to introduce the genera *Colænis* and *Dione* into the *Heliconinæ*, considering that their resemblance to *Heliconius* and *Eueides* is so great, both in structure, habits, and transformations, that the difference in the wing-cells ought not to be considered; but I do not wish to disturb the usual arrangement in the present series of papers.

(The present paper has been accidentally transposed; it should have preceded the first paper on *Nymphalinæ*.)

ICHNEUMONS.*

By EDWARD A. FITCH.

“THE most formidable difficulty in the way of the investigation of some of what I have called the ‘neglected orders,’ is the want of accessible handbooks.” So says Dr. Parsons in a paper, on the general study of Natural History, read before the Selby Naturalist’s Society (see the ‘Naturalist,’ December, 1877, and January, 1878). This paper contains many worthy hints, which deserve to be borne in mind and acted upon by entomologists especially, and sets forth many important truisms. The study of the terebrant Hymenoptera has been greatly retarded in Britain by the want of accessible handbooks. However we have one now in course of publication which will certainly be a great help to the student of the entomophagous section of this interesting class of insects. The author has also been the elucidator of the life-histories of the phytophagous sawflies, many of which have been translated into the pages of the ‘Zoologist’ and ‘Entomologist.’

Of the neglected Ichneumonidæ we have, thanks to Mr. Marshall, an excellent catalogue; but I believe there is by

* ‘Pinacographia.’ Illustrations of more than 1000 species of North-west European Ichneumonidæ sensu Linnæano. Parts 1–6, quarto. Martin Nijhoff, The Hague, 1875 *et seq.*

no means a representative private collection in Britain. Mr. Desvignes's is now located in the British Museum, which also contains the general collection of Dr. Reuter. Mr. F. Walker's was the hard work of a life-time, but unfortunately would have required another life's work to have made it of use; the number of specimens was large, and many interesting, but it lacked all system or arrangement.

There are but few entomologists who do not know these insects, many certainly with dislike; but the few who have wished for a better knowledge of the families, and the truly wonderful economy of the species, have been deterred for the want of an instructor. This is to be deplored, as from their parasitism many species will necessarily remain extremely local, though perhaps not rare, and the economy of others, for lack of the determination of the species, remains unrecorded. Some years ago the fine *Arotes albicinctus* was considered a very rare insect. When the indefatigable Mr. F. Smith was at Mr. Stephens's, on one of his memorable Wednesday evenings, conversation turned on this insect. Mr. Stephens described the very oak tree, in a lane near Darenth Wood, on which he had captured the species. Mr. Smith journeyed to "Darn," sought out the described tree, and there on its trunk was *Arotes* waiting for him. A fine instance of the value of locality. Till use is made of the opportunities which continually offer for the classification of these facts, the progress in the study must be small. Few are preserved, and these seldom to a good purpose. The whole proceedings with these parasites, continually being bred from insects of all orders, show nothing but neglect: that this has been the case is particularly observable. Since my remarks last December I have received three small parcels of Ichneumons, and curiously enough each has contained a species new at least to Britain: this shows how much is to be done. With bred specimens a knowledge of the economy of both the prey and the preyed upon cannot fail to lead to important results: this has also been greatly neglected. Mr. F. Bond, during his long experience, acquired a considerable collection of the lepidopterous parasites, each specimen being labelled with information as to its parasitism. These he gave to the late Mr. Desvignes, who, although a very talented entomologist, was unfortunately a systematist; and on acquiring this interesting collection his first action was to remove the disfiguring labels, and so destroy its essential value.

Another fact militating against the scientific study of the Ichneumonidæ and allied families has been the involved synonymy, this owing to the writings of the various authors being so scattered that many were unknown the one to the other; further than this the same insect is repeatedly described under different names, and different insects under the same name,—this even by the same author. The difficulties created by this latter fact made the following of Walker in the *Chalcididæ* seem to me almost a hopeless task. Vollenhoven's beautiful figures will serve as a starting point to remedy much of this. An instance:—I happened to take Part VI. to the British Museum; on looking through it Mr. F. Smith at once detected an apparent error. Plate 30 beautifully illustrates the three first genera of the *Chalcididæ*; fig. 1 was named *Smicra sispes*, L. Here was the confusion: the species with yellow femora was discovered by the late Mr. F. Walker to be parasitic on the curious larva of the *Stratiomydæ*, from which it was also bred by Mr. Smith, and was generally known as *S. sispes*. To prove this the National Collection was examined; this quite corroborated Mr. Smith's opinion. Van Vollenhoven's species was the one with red femora. To prove him wrong Fabricius was referred to, and there we find—"C. nigra abdominis petiolo femoribusque posticis incrassatis *flavis*;" but to make doubly sure we went back to Linné, and there sure enough was "*rufis*." Thus, through Fabricius's careless copying, error was perpetuated, at least in Britain.

The fourteen plates of the 'Schetsen,' published some ten years ago, were a valuable aid to the study of the Hymenoptera: what Meigen did for the Diptera, Van Vollenhoven wished to do for the Hymenoptera. 'Pinacographia' is a continuation of this venture on a larger and more elaborate scale: the work is published at the Hague in parts, which appear at irregular intervals; six have already appeared. Each part contains eight pages of letterpress and five coloured plates; the price is 3.50 fl. (about seven shillings English) per part. The text is printed in parallel columns in Dutch and English, which is intelligible, if not good: this part of the work is undoubtedly poor and superficial as far as it at present goes, but better things are promised. "Of course the text is a matter of secondary importance, and will only contain the explanation of the plates, diagnoses and short descriptions of new species, with analytical tables, and some remarks on Biology. Meanwhile it may be possible that the drawing of

such a number of figures will procure me so much knowledge of the relationship of the different genera that I may be induced at the end of this work to give a general systematical review of the families examined." This is from the Introduction; and if the tables of species and tables of parasitism, which are promised, be given it may be made a complete work. Much of Ratzeburg's information needs revision. Too much cannot be said in praise of the extreme excellence and beauty of the plates: they are so absolutely correct both in colour, delineation of the structural details and general excellence of production, that it must be almost impossible to fail to recognise the species at once. They are all drawn by Snellen van Vollenhoven himself, and most carefully engraved by A. J. Wendel. With these figures at hand it can be by no means difficult to work out to a fuller understanding of the genera the descriptive works of Gravenhorst, Förster, and Thomson, or the scattered papers of our own Haliday and Walker in the smaller species. '*Pinacographia*' treats of the *Ichneumonidæ* in the Linnean sense, and so includes most of the parasitic Hymenoptera, viz., the *Ichneumonidæ*, the *Braconidæ*, the *Proctotrupidæ* (*Oxyura*), and the *Chalcididæ*. A synopsis of the various genera has already been translated into English;* and it is to be hoped the appearance of the work now under notice, if carried to completion, will materially help to the filling in of this large framework. Although printed in English I believe there are something less than half a score copies of this beautiful work find their way into Britain; this I can but think is because it is not better known. For an acquaintance with Ichneumons generally there is certainly nothing to equal it.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

NOTES FROM GUERNSEY.—Through illness and other causes I have been prevented from doing much in Entomology during the past two years. I am, however, pleased to record two additions to my list of Macro-Lepidoptera

* "Translation of Synoptical Arrangements of some European families and genera of Hymenoptera," by Francis Walker: London, E. W. Janson, 1874; price 1s. "Notes on Chalcidiæ," by Francis Walker: London, E. W. Janson, 1871, 1872; Parts I.—VII.; price 6d. each. "Notes on the Mymaridæ," by Francis Walker: the 'Entomologist,' October, 1873; price 1s. "Notes on the Oxyura," by Francis Walker: the 'Entomologist,' November, 1873; January, 1874; February, 1874; price 6d. each.

inhabiting these islands, viz.—a specimen of *Ephyra punctata*, captured by a lady in her garden, St. Peter-Port, Guernsey; and one *Xanthia silago*, taken at sugar, by the Rev. G. H. Engleheart, in Sark, during September, 1874, and accidentally omitted from my list. Last year I had a splendid specimen of *Argynnis Lathonia* brought to me. From its condition it had evidently just emerged from the chrysalis. A larva found feeding in the seed-head of an Indian pink turned out to be the common *Dianthæcia capsicola*. *Colias Edusa* was very abundant last year all over the islands: in clover and lucerne fields they actually swarmed; and were as common in gardens as the *Pieridæ* in ordinary seasons.—W. A. LUFF; Guernsey.

ACHERONTIA ATROPOS IN THE COUNTY CORK.—A specimen of this moth made its appearance, and was captured at Schull, on the evening of June 8th, at 9.30. It flew into the drawing-room of the house in which it was taken, and attracted attention by the heavy flapping of its wings against the windows. It “cried” frequently while it was being caught, and afterwards.—W. W. FLEMYNG; The Vicarage, Glengariff, co. Cork, June 17, 1878.

FOOD OF ACHERONTIA ATROPOS.—On August 6th, 1877, I found a larva of *Acherontia Atropos* feeding upon the spindle tree (*Euonymus Europæus*). Is not this of rare occurrence? —FRED. ENOCK; 30, Russell Road, N.

CHÆROCAMPA CELERIO AT ALDERLEY EDGE.—While standing near an azalea tree in full bloom, on May 24th last, I captured a specimen of *Chærocampa celerio*. It is a little rubbed upon its thorax, but is otherwise in good condition.—WM. W. KEYWORTH; Alderley Edge, near Manchester, May 25, 1878.

STAUROPUS FAGI.—On the evening of June 5th I had the pleasure of taking a fine male example of this somewhat scarce insect, on the trunk of a fir tree, in Knowle Park, Sevenoaks. It was in beautiful condition, and had apparently never flown.—C. J. BIGGS; South Hackney, June 18, 1878.

ACRONYCTA ALNI BRED.—The larva of *Acronycta alni*, recorded in the ‘Entomologist’ by me in 1877, produced a perfect specimen on the 27th May this year.—T. H. TAYLOR; George Street, Wakefield.

A TORTRIX NEW TO BRITAIN (*PENTHINA POSTREMANA*).—Last autumn, having nothing else to do, I was sitting on an old stump looking at the peculiar jointed stems of the balsam (*Impatiens noli-me-tangere*); I fortunately split one open,

and found a larva, of a dirty whitish colour and a dark black head, ensconced snugly inside. Seeing it was a Tortrix larva, and in such a rare plant, I spent three days hunting them. The result has been, on May 4th last, I bred two specimens of the very handsome *Penthina postrema*. Since then I have bred three more specimens. I sent one to Mr. C. G. Barrett for examination, and he has identified it for me. Prior to that Mr. Stainton had written me there were only two Tortrices known to feed in the stems of the balsam on the Continent, viz., *Penthina fuligana* and *P. postrema*. Luckily it is the new one, although the former is still a rare species.—J. B. HODGKINSON; 15, Spring Bank, Preston, May 26, 1878.

 REVIEW.

*The Transactions of the Entomological Society of London
for the year 1877.*

THE volume for 1877, although not quite so bulky as its predecessor, certainly cannot be said to be far below it in interest, more especially to the student of British or applied Entomology apart from the descriptive, though much of this interest will perhaps centre in the Proceedings. In the number of memoirs which it contains it exceeds the volumes for both 1875 and 1876, and is the same as that for 1874. Of the twenty-eight separate papers fifteen are purely descriptive, and four are revisions or monographs of certain special families. Of the remaining nine, five are of more or less general interest, and four only can be said to come within the range of the observing and general entomologist; still, as the custom is, this must be looked upon as a fair average.

For four, out of the above-mentioned five, memoirs our thanks are due to the President, Prof. Westwood. They are entitled:—"Notes upon a Strepsipterous Insect parasitic on an Exotic species of Homoptera;" "Notes on the genus *Prosopistoma* of Latreille;" "Entomological Notes;" and "On the adult Larvæ of the *Stylopidae* and their Puparia," which is by Sir Sidney Saunders, with further remarks and figures by the Professor. These observations are supplementary to the first paper on the Stylopoid parasite of the Borneon Homopteron. The fifth of these memoirs is a "Note on *Mygale stridulans*," by Prof. James Wood-Mason, which contains a graphic and detailed description, from the pen of Mr. Peal, of the way in which this spider stridulates; it is

also accompanied by a capital plate. Prof. Westwood's "Entomological Notes" are (1) on the pupa of a trichopterous insect (*Anabolia nervosa*), which swam about in water like a *Notonecta*, with some remarks on its structure and habits; (2) on the parasitism of certain lepidopterous insects, which contains observations on a lepidopterous larva captured in South India clinging to the abdomen of an Homopteron; Prof. Westwood thought it an instance of true parasitism, but Mr. Wood-Mason, the original owner of the specimens, inclined to the opinion that the larva was the messmate, rather than the parasite, of the Homopteron; (3) on the lepidopterous genera *Himantopterus*, *Wesmael*, and *Thymara*, E. Doubleday. The former of these (the unique specimen of which is in the Brussels Museum) was transferred by Dr. Hagen to the Neuroptera; it is here relegated to the Lepidoptera, as an ally of *Thymara*, in which class it was originally described by Wesmael.

The four memoirs which may be looked upon as of more general, if of less scientific, interest, are Mr. Distant's paper on "The Geographical Distribution of *Danaïs Archippus*;" Mr. J. W. Slater's two papers on "The Food of Gaily-coloured Caterpillars," and his "Vivarium Notes on some common Coleoptera;" together with another of Mr. Mansel Weale's highly interesting papers on "The variation of Rhopalocerous forms in South Africa." This latter paper is thus summarised in the Proceedings:—

"The author, after stating that he had travelled over most of the eastern districts of the Cape Colony, alluded to the distribution of plants as affecting that of insects, and noticed the apparent encroachments of the subtropical flora and insect fauna along the south-eastern seaboard, the absence of any great barriers, and the general uniformity tending to produce close variations. He exhibited and remarked on a large series of *Papilio merope*, male and female, some reared by him, and all collected in one small wooded gully, isolated in an open grass country. He also exhibited male and female *Nymphales xiphares* (*Thyestes*), the male of which is wanting in the National Collection, remarking on the apparent imitation by the female of *Amauris echeria*. He next exhibited and remarked on a series of imagines of *Acræa esetria*, some of the forms of which are separated by some entomologists, and stated that all the forms had been reared from larvæ collected on a single plant. He next exhibited a series of *Junonia pelasgis* and *J. archesia*, showing a very close gradation linking the two forms, and showed that some of the latter approached *J. amestris*, although the alliance was not so evident as in *J. pelasgis*. He objected to the use of the name "species" as too freely used among plants and insects, and suggested that it merely implied a

provisionally uncertain distinction of apparently important differences. In illustration of this he exhibited specimens of *Callosune evarne* and *C. keiskamma*, two forms hitherto held distinct, but of which the ova, larvæ, and pupæ exhibited no differences, although in two broods in successive years the forms appeared separately. He also remarked on artificially produced changes in the pupæ."—P. xiv.

Mr. Slater's first paper contains some interesting facts upon the food and protection of certain lepidopterous larvæ, presumably with a view to prove that there is a connection between "conspicuous coloration and a poisonous or offensive food-plant." His notes on Coleoptera refer to the habits of several well-known species, many interesting facts being spoken to from direct observation: an important one is that the *Telephori*, from their pugnacity, so well known as "soldiers" and "sailors," are diligent devourers of *Aphides*; and Mr. Slater goes so far as to say that "In this respect I should think that they are more serviceable to the farmer and gardener than the ladybirds, being more voracious, more active, and, on the average, more numerous."

Mr. Distant's memoir is a rather elaborate paper on "The means of Dispersal and Conditions which are favourable to the Survival in a New Habitat," of Lepidoptera in general, with especial reference to *D. Archippus* in particular. Three or more specimens having occurred in Britain in the autumn of 1876, it is not unlikely that before long this species may gain a permanent settlement here, as it has done in many other lands, notably in Australia.

In the Proceedings, which, together with the President's Address, index, &c., extend to ninety-three pages, there is much to interest all. Numerous specimens, consisting mostly of varieties and monstrosities of Lepidoptera, and new or interesting species of other classes, were exhibited at the Society's meetings: these are all specially referred to. Some valuable communications on stridulation and mimicry were brought forward by Prof. Wood-Mason and others. Our notice is already long, but the following three extracts may be new and of interest to many of our readers:—

Season-dimorphism in Lepidoptera.—"The President read some interesting remarks from a letter he had received from Mr. B. G. Cole respecting some specimens of *Ephyra punctaria* which he had bred from eggs laid by the same female, the greater number of which emerged from the pupæ in July (as the spotted variety), while the remainder appeared in May, in all respects resembling the mother. He repeated the experiment in 1876 with similar results; all but one pupa from a batch of eggs laid in May appeared in July as the

spotted form (males and females), the single exception remaining still in pupa, which it was presumed would appear during the coming May in the vernal dress. In this latter case he had reared a second brood of larvæ from eggs laid by some of the July females, all of which were now in the chrysalis state. Mr. Cole added:—"May not the above be considered a case of "season-dimorphism" analogous to that occurring in *Pieris*, *Araschnia*, *Selenia*, &c., as investigated by Dr. Weismann, a slow process of development during the winter being necessary for the May form (which may be considered the type), whilst if the development of the pupa is hastened by the heat (and light?) of summer, the smaller and less perfect individuals are the result? Referring to the similar case of *Selenia illustraria*, Dr. Knaggs (Ent. Mo. Mag. iii. 238) remarks as follows:—"It is pretty well known that in the natural sequence *S. illustraria* reproduces itself in the form of *S. delunaria*, and *vice versâ*. But what I assert is, that whenever (whether at large, owing to exceptionally hot or long summer seasons, or in captivity from warmth, assisted perhaps by what Mr. Crewe has happily termed 'feeding up quickly') the completion of the pupal stage is accelerated, then *S. delunaria* produces *delunaria*, not *illustraria*. Further, it is my belief that the converse will be found to hold good, *viz.*, that should the completion of the pupal stage be retarded either by cold seasons or climates in a state of nature, or artificially by aid of an ice-well, *S. illustraria*, not *S. delunaria*, would be found to result from *S. illustraria*." And again (*loc. cit.*, p. 256) he puts it thus:—"If *I.* = *illustraria*, *D.* = *delunaria*, and — = winter; then if there be but one brood in the year the sequence will be *I.* — *I.* — *I.*, and so on; if two broods, *I. D.* — *I. D.* — *I. D.*, and so on; if three broods, *I. D. D.* — *I. D. D.*, and so on." I have not yet tried the effect of artificial retardation on the pupæ of *Ephyra*, but intend to do so when opportunity offers. My experiment shows that the effect of natural retardation over the winter months is to produce the type whatever may be the form of the parents; and that such natural retardation does usually (? always) occur in double-brooded species I believe to be true from my experience in breeding various insects. Remembering that the summer broods of season-dimorphic species are smaller, and apparently vitally weaker than the spring ones, and that it is from the former that the latter are usually descended, may we not assume that the provision by which some few of the direct offspring of the spring forms are preserved through the winter in the pupal state, and so are enabled to pair with the offspring of the summer form, is of advantage to the species, in affording a "cross" between individuals which have developed under very different conditions? A similar benefit may be derived in the commonly observed case of individual pupæ of single-brooded moths (*e.g.*, *Eriogaster* and many *Notodontidæ*) remaining two, three, or more years in that stage, and then eventually making their appearance at the proper season with the ordinary flight of the species. As bearing on the above suggestion, I may refer to what occurs in those single-

brooded moths (*Sphinx Convolvuli*, *Acherontia Atropos*, &c.), which sometimes appear abnormally from the pupa before the winter hibernation, or which by "forcing" have been artificially so developed. It has been stated, I believe, in most such cases in which an anatomical examination has been made, that the ovaries, &c., were found in an abortive or rudimentary condition. This goes to show that a long period of quiescence is necessary to perfect these delicate and highly specialised organs, and by a parity of reasoning it may perhaps be assumed that those pupæ which remain longest in that stage will (*ceteris paribus*) produce the most highly developed and vitalised imagos."—Pp. vi, vii.

Pickles.—"Mr. Douglas, who was unable to be present at the meeting, had forwarded to Mr. Jenner Weir a letter he had received from Mr. R. A. Ogilvie, enclosing specimens of an insect found in great quantities in a jar of pickles (piccalilly). They confined their attacks to the pieces of cauliflower in the jar, which they appeared to relish, notwithstanding the vinegar, mustard, pepper, &c., in the pickles. The species had been submitted to Prof. Westwood, who replied that 'the flies were the common *Drosophila cellaris*, with their curious two-horned pupæ; and they frequent cellars and cupboards, delighting in stale beer, wine, &c.' He supposed that 'the cauliflowers were more to their taste than the other things in the jar, being more succulent and flabby.' In answer to a question put by Mr. Ogilvie, he said that the eggs were laid in the pickle-jar, and not in the vegetables before they were pickled."—P. xv.

Dermestes ravages.—"Mr. W. L. Distant exhibited a specimen of the ravages of *Dermestes vulpinus* (Fab.) in a cargo of dried hides from China. On the arrival of the hides in this country they were found to be infested and gnawed into holes by swarms of the insect in their different stages, causing a damage of from fifteen to twenty per cent. on the value of the cargo. It is not unusual to see this well-known insect amongst these articles, but quite unprecedented to find it in such numbers and causing such an amount of damage. In fact, its appearance had quite paralysed the importation of the hides, and gave further proof of the value of Economic Entomology in the arts and manufactures. Mr. M'Lachlan exhibited a portion of a wooden case containing hides from Shanghai, which was riddled with borings of the larvæ of this beetle."—P. xxii.

At the Annual Meeting in January last a satisfactory report was received from the Council, and the President, Prof. Westwood, read his Address, which gave a general *resumé* of the entomological work accomplished in the past year. The following officers and council were elected for 1878:—President, H. W. Bates; Treasurer, J. Jenner Weir; Secretaries, R. Meldola and W. L. Distant; Librarian, F. Grut; other members of Council, G. C. Champion, J. W. Douglas, Rev. A. E. Eaton, E. A. Fitch, G. Lewis, E. Saunders, F. Smith, and Prof. J. O. Westwood.

OBITUARY.

WILLIAM CHAPMAN HEWITSON.—Born at Newcastle-upon-Tyne, on the 9th January, 1806; died at Oatlands, Walton-on-Thames, on the 28th May, 1878.

Educated at York, and brought up as a land surveyor, the early days of railway enterprise found Hewitson at work under George Stephenson; and he was for some time engaged on the London and Birmingham Railway. But delicate health and the possession of competent means combined to induce him to abandon active employment of this nature. Leaving his northern home he resided for a time at Bristol, thence moved to Hampstead; and finally, in 1848, he purchased some ten or twelve acres of Oatlands Park, and built the house in which his last thirty years were spent. He joined the Entomological Society in 1846, the Zoological in 1859, and the Linnean in 1862.

In early life he collected British Coleoptera and Lepidoptera, and his name is not unfrequently mentioned in Stephens's Illustrations; but for some years he devoted his attention principally to the study of birds' eggs; and in 1833 he made a trip to Norway to discover the breeding places of some of our migratory species. A few notes from his pen on the Ornithology of Norway will be found in the second volume of Jardine's 'Magazine of Zoology;' and other notes on ornithological or oological subjects appeared from time to time in the 'Ibis,' the 'Zoologist,' and other periodicals. But in this branch of Science, as afterwards in Entomology, it was by his pencil and brush, rather than his pen, that he achieved distinction; and for accuracy of delineation and careful colouring of the eggs his 'British Oology' has never been surpassed.

The earliest of Hewitson's entomological notes was on the economy of *Hedychrum* (*Chrysididæ*), and appeared in the 'Entomological Magazine' for 1837. In the summer of 1845 he made an excursion in the Alps, and the result was some "Remarks on the Butterflies of Switzerland" (Zool. iii. 991). From the time of his settling near London, with the facility he thereby acquired for studying foreign species, his passion for Diurnal Lepidoptera developed itself, and he may be said to have devoted the rest of his life to the description and figuring of species of exotic butterflies.

It is needless to say that Doubleday and Westwood's magnificent work, 'The Genera of Diurnal Lepidoptera' (2 vols., folio, 1846—52), was illustrated by Hewitson. This was followed by 'Illustrations of Exotic Butterflies' (5 vols.,

quarto, 1852—77); “a twenty-five years’ labour of love,” as he himself described it, whilst regretting that age and failing health warned him to bring it to a close. In 1862 there appeared a specimen of a ‘Catalogue of *Lycænidae* in the British Museum,’ containing eight plates of *Ogyris* and *Amblypodia*; but the Trustees declined to continue the work according to Hewitson’s plan, and he commenced, under the title of ‘Illustrations of Diurnal Lepidoptera,’ a series of plates of *Lycænidae*, of which seven parts appeared between 1863 and 1877, the eighth and concluding part being in preparation at the time of his death.

Besides the descriptive letterpress which accompanied these illustrations, Hewitson published numerous memoirs in the ‘Zoologist,’ the ‘Annals and Magazine of Natural History,’ the ‘Journal of Entomology,’ the ‘Entomologist’s Monthly Magazine,’ the ‘Proceedings of the Zoological Society,’ the ‘Journal of the Linnean Society,’ the ‘Transactions of the Entomological Society;’ and in 1869 and 1870 he published as a separate work, ‘Equatorial Lepidoptera collected by Mr. Buckley.’ With few and slight exceptions (*e.g.*, Proc. Ent. Soc., 1856, p. ii., 1866, p. xxxv.; Trans. Ent. Soc., 1868, p. 97; Ent. Mo. Mag., vi. 96, ix. 161) these papers were simply descriptions of new species, many of which were afterwards figured in the works to which reference has already been made. The list concludes with ‘Descriptions of four New Species of *Pronophila*,’ which appeared (Ent. Mo. Mag., xiv. 227) so recently as March of the present year.

Hewitson married some thirty years ago, but was soon left a widower and childless. His health compelled him to lead a quiet and secluded life; and thenceforward his sole delight lay in beautifying his grounds at Oatlands, and in adding to his cabinets of butterflies. His ample means enabled him to indulge his tastes without stint. Gathered from all quarters of the globe, brought home by naturalists often sent out for the very purpose, the specimens selected regardless of cost, arranged with scrupulous neatness, and stored in cabinets of superb solidity,—Hewitson’s collection of Diurnal Lepidoptera was such as no other man had formed, such probably as no museum ever possessed. Together with some choice pictures and water-colours, and some valuable cases of stuffed birds, he has left it to the nation; and it is presumed that this magnificent and unique collection of *Rhopalocera* will find a permanent and fitting home in the National Museum.

His library of works on Natural History, with a legacy

of £3000, he has left to the Natural History Society of his native town; and the bulk of his considerable fortune is bequeathed to various charities and in legacies to his numerous friends.

His weak health and the seclusion of his life may perhaps have created what to strangers would appear a tinge of sourness in his disposition; whilst a natural slowness to accept new ideas may have led others to impute to him some degree of narrow-mindedness. But in truth he was of a gentle, kindly, and generous nature; and those who knew him best will most deeply mourn his loss. If not a great man, he was at least a good one.

But it is rather with the entomologist than the man that we have here to deal. It cannot indeed be said of Hewitson that he exhibited any breadth of view in scientific matters, or did much to advance the philosophy of Natural History, or to increase our knowledge of the economy even of his favourite group. Confining himself exclusively to a single section of a single order of insects, his writings contain little on the habits of the *Rhopalocera* he figured, little on classification or distribution, little on any of the interesting questions and speculations that give life and charm to Natural Science of the modern school. For these reasons he cannot be placed in the front rank of entomologists; and in truth he never aimed to be more than a describer and faithful depicter of species discovered by others. He was a great lover of Nature and of the beauties of natural scenery, yet he was emphatically a student of the cabinet. His figures, admirable as they are, are the figures of so many butterflies taken out of a drawer,—all wings, set out with provoking uniformity, no leg or palpus visible, no details of structure, without any idea of life: they seem to tell their own tale that they were painted by one who had never seen them in their native haunts, who knew them only as cabinet specimens. But in spite of this want of animation, in his own line as a pictorial describer of butterflies Hewitson stands unrivalled; and whether we look to the folio plates of the *Genera*, or the quarto illustrations of *Exotic Butterflies* and of the *Lycænidæ*, he is fairly entitled to the highest praise, as well for the accuracy and carefulness of his work, and the excellence and beauty of his colouring, as for the patient perseverance with which, for more than thirty years, he followed out his plans.

His epitaph must stand—"PAPILIONUM PICTOR, ET PICTOR PRÆCELLENS."

J. W. DUNNING.



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VARIETIES OF LEPIDOPTERA AT THE NATIONAL ENTOMOLOGICAL EXHIBITION.

THE Editors of the 'Entomologist,' wishing to commemorate the first National Entomological Exhibition, have with this number presented the subscribers with a Plate of some of the most interesting aberrations of Lepidoptera exhibited on that occasion. The following are short descriptions of the specimens figured:—

No. 1. *Clostera curtula*.—The specimen figured is a hermaphrodite; the right side having the ordinary coloration of the female, and the left that of a rare variety of the male. This singular insect was, and is now, in the cabinet of A. B. Farn, Esq. Unfortunately, while this specimen was being drawn for the accompanying plate, the antennæ were accidentally broken off; but they were here depicted before this misfortune happened.

No. 2. *Leucania conigera*.—This insect has the normal coloration of the upper wings; but the left lower wing is both in structure and colour partly like the upper wings, and also has one white spot in the centre. The insect was captured by Mr. W. P. Smith, while mothing, in July, 1877, in Clatter House Lane (near the Welsh Harp), Middlesex.

No. 3. *Chærocampa porcellus*.—A very pale aberration, in which all the rosy crimson of the species is replaced by yellow, and the coloration much subdued. The insect is in the cabinet of Sir Thomas Moncrieffe, and was captured at Moncrieffe by the owner. This specimen is in beautiful condition, and was at the time of capture evidently fresh from the pupa.

No. 4.—This is probably a melanic variety of an *Eupithecia*; it has the ordinary appearance of the species

so obscured that, although the figure is correctly executed, it is quite impossible to recognise the species. The specimen figured, which is in the cabinet of Mr. W. Prest, of York, was bred by that gentleman from among a number of larvæ of *Eupithecia* taken at Bishop's Wood, Selby, Yorkshire. He states that he rears one or two of this curious form each season, from amongst larvæ of *E. albipunctata*, all collected in a like manner in the same large wood. Mr. Prest has named this variety or species, whichever it may turn out to be, *Eupithecia angelicata*, from the *Angelica sylvestris*, on the seeds of which plant the larvæ are found feeding.

Nos. 5 and 6. *Vanessa Atalanta*.—The upper and under sides of this aberration are both figured; the scarlet markings of the upper side of the anterior wings are partially suffused with yellow, and the white spots towards the apex are very large. It is difficult to describe the variation of the under side, but the two conspicuous blue spots are very remarkable. The specimen was bred, September 21st, 1867, by William Smith, of Birmingham, from a larva taken at Aston; and he stated at the time that the larva had gold spots on each segment. The specimen is now in the possession of Mr. F. Enock.

No. 7. *Liparis dispar*.—Mr. Enock, who possesses the specimen figured, bred in the year 1867 upwards of eight hundred males and females of this species, and nearly all had the under wings notched, as seen in the illustration.

Nos. 8 and 9. *Epione vespertaria*.—No. 8 is a very richly coloured male, very much darker than usual, and wanting the usual reticulated markings. It was captured by Mr. Prest, of York, at Sandburn, near that city, July 13th, 1874. This seems to be an hereditary form, for several have been taken in other seasons, in nearly the same place, of the same shade of colour, but none deeper in tint than this example. No. 9 is a male, with the coloration usually found in the female only. It has also the left anterior wing somewhat reticulated, as in the male, but the right anterior wing and posterior wings are like the other sex. This example was exhibited by its captor, Mr. G. C. Dennis, who took it on the well-known *Vespertaria* ground at Sandburn, on July 22nd of last season.

ENTOMOLOGICAL ECHOES.

Contributed by FREDERICK SMITH, F.Z.S.

DURING the course of the publication of the 'Illustrations of British Entomology,' Mr. J. F. Stephens, the author, received communications from numerous correspondents, in which localities and captures of rare and local species were made known, and much valuable information relative to the habits and economy of others was furnished. The letters were given by Mrs. Stephens, subsequent to the death of her husband, to Dr. Gray, who had them bound up in a volume, which he placed in my hands, with full permission to publish any extracts I might make and deem sufficiently interesting. The collection consists of two hundred and twenty-five distinct letters, all treating more or less on Entomology. The greater part relate to Coleoptera, a considerable number to Lepidoptera, and but one or two to Hymenoptera and Diptera. They give accounts of the occasional capture of foreign species, their visits, the mode whereby they reach this country, &c.—this being in some instances inexplicable; but such captures it will be seen have been formerly made, and will doubtless continue to be made occasionally in future.

A remarkable instance of this kind occurred a few years ago, when a Brazilian wasp was taken in three widely distant localities in England. On an excursion to Cornwall I took up my temporary residence at Penzance, and there met with a lady who collected Coleoptera, and was a resident of the place. I had made her acquaintance previously on one of her visits to London. She took the opportunity of my visit to Penzance of asking me to name a few insects she had captured in her own neighbourhood. On opening her collecting box I at once caught sight of a Brazilian wasp. To my enquiry as to where she had taken that particular insect, she at once replied, "In my own bed-room; several of them flew in, and I caught two or three, as I thought it was an insect I had not previously seen. I took those last year, but I have seen others this year during July and August." On making further enquiries I found the window of the bed-room looked into the harbour of Penzance. I expressed my opinion that the wasps had been imported by ships trading with Brazil. My friend made the necessary enquiries, and ascertained that vessels laden with raw hides had entered the harbour. She was told by one of the

captains that as he was sailing down one of the rivers in Brazil these wasps were attracted in such numbers by his savoury cargo as to prove a terrible annoyance to all persons on board, and that considerable numbers of the wasps had continued on board the whole of the voyage home. It was a remarkable circumstance, that subsequently came to my knowledge, that specimens of the same species of wasp, *Polistes biguttatus*, were also taken at Liverpool and in the London Docks the same season.

The above clearly points to the way in which these hymenopterous insects were imported; and we can, on calling to mind the various kinds of freight conveyed from all parts of the world, readily account for the introduction of insects of other orders, some of which, as we well know, have been so long acclimatised as to have taken their place in the lists of our indigenous insects.

Among the letters some have neither date nor address, but are no doubt arranged chronologically; sometimes internal evidence, and sometimes the date of the postmark, supplying the necessary information. The correspondence commences in 1818 and terminates in 1831.

LEPIDOPTERA.

“The swallow-tail, *Machaon*, was found in the caterpillar state feeding on carrots in a garden adjoining some marshes, near Deal, July 7th. It changed into a chrysalis in a few days; and the butterfly appeared in nineteen days.—Miss HARVEY; Upper Deal.”

“In your last number I observe you say there is no authentic specimen of *Podalirius* known. I beg leave to state there is one in my possession unset, and taken at Netley; and as there existed doubts about its being a native I have kept it just as I captured it; its larvæ, of which I have had two, feed on the wild white plum tree. One of these days I hope to add it to other collections.—Rev. F. W. HOPE; July 8, 1827.”

“An account was sent to you, I believe, by my friend E. Hornor, of the capture of a pair of *P. Podalirius*. The gentleman by whom they were taken, and who resides at Sunderland, says that he caught them several years ago in a wood near Oxford. He showed them to a person who lived near, and he told him that he had seen several of that kind in the same wood. The gentleman who captured them was no entomologist himself, and could not be interested in

palming a deception upon the public of entomologists; and imagined some of *Argynnis Paphia*, which he took at the same time, to be much more rare. One of the insects was in a good state of preservation. I myself see no reason to doubt the fact of their having been captured in England. A specimen of *Sphinx lineata* was taken at Sunderland in the year 1823; and *Sphinx Atropos* was taken buzzing about a beehive in search of its favourite food.—J. O. BACKHOUSE; April 16, 1828.”

“I have taken *Papilio (Steropes) Paniscus* several years, between Woodstock and Enstone; *Polyommatus Cimon (Acis)*, at Coleshill, Warwickshire; *P. (Cænonympha) Polydama*, in abundance on the mountains between Bala and Festiniog, North Wales; also with it, as Mr. Haworth assures me, *P. Typhon (Cænonympha Iphis)*. Last year I saw in a collection, at Coventry, specimens of the beautiful *Europome (Colias Europome)*, which I was told had lately been taken at Dudley. *Antiopa* also has been taken of late years near Coventry; one of the specimens I have seen among them has a yellow border, like the foreign ones.—Rev. W. T. BREE; July 14, 1827.”

“I send you three specimens of *Hipparchia*, being all I have left of the numerous specimens I took on the mountain bogs, between Bala and Festiniog, North Wales, July 21st, 1809. Of these three I have Haworth’s authority for saying that two are *H. Polydama* and one *H. Typhon*, which last is doubtless the reversed specimen. To me, however, it appears to be spinning too fine to separate them.—Rev. W. T. BREE; August 18, 1827.”

“I proceed to make a few remarks on what you state under the head of *Hipparchia Iphis*, and *Polydama*, as relates to myself. Your account, though literally true, may yet lead to error, from the circumstance of your not being in possession of the *whole* truth. The fact is I took a number of specimens of one or both species (for they were in great abundance), but was not aware that they were of more than one kind. Many I gave away; and some years after, our friend Haworth, looking over my remaining specimens (some six or seven, perhaps), observed to me that there was one of a different species from the rest. Now I think it probable that I might have taken more than one specimen of *H. Iphis*, and can scarcely doubt that had a more accurate entomologist been on the spot he might have taken both kinds in some plenty.—Rev. W. T. BREE; April 17, 1828,”

"*Vanessa Antiopa* has several times been taken near Seaton, in the county of Durham, often floating on the water of the River Tees. I think this fly must breed in the salt marshes, and in windy weather be blown into the water. *Hipparchia Blandina* was taken the beginning of this month plentifully, at Castle Eden Dene. This, I believe, is the only place in England where it is found. It was taken there first, I think, four years ago.—THOS. BACKHOUSE; York, 8 mo. 25, 1827."

"*Pamphila comma* I capture in Collingbourne Wood.—Rev. G. T. RUDD; Kimpton, March 18, 1828."

"In Lepidoptera I have been taking *Pamphila comma*; and Mr. Dale has found it at Old Sarum. In May last I took *Acronycta alni* in Collingbourne Wood, Wilts.—Rev. G. T. RUDD; Kimpton, Andover, September 18, 1828."

"During my collecting this year I have met with empty pupæ cases of *Catocala fraxini*; and although I have searched for it (the moth) have not been able to obtain it. Can you inform me the right period of its assuming the pupa state? I have also taken *Endromis versicolora* this year. After *Colias Edusa* has appeared in profusion I believe the reason why they almost entirely disappear the following season is in consequence of their larvæ being punctured by a peculiar Ichneumon which has a predilection for these insects.—D. G. KERRIDGE; Ipswich, October 22, 1828."

"As I passed through Manchester i saw about 100 *Davus* taken at Ashton Moss this summer, without one a proaching in collar on the under side to *Iphis* or *Polydama*; i think they verey much differ from those teaken in Cumberland. I teaken a nother Clifton Nonperiel (*Catocala fraxini*). Seeman has teaken plenty of Purple Emperors, but I dont like to send to him for some for fear he dont send them fine. I left of loosing my time A showing my insects for nothing, as i found in the calculation of time to be a bout a month in 12 month; so now I makes a charge; if they comes to see must pay me for my time.—RICHARD WEAVER (Collector and Dealer); Birmingham, October 29, 1828."

"In the summer of 1820 I discovered several larvæ of *Psyche fusca* at Hornsey Wood, but being then ignorant of its rarity I took little notice of it; but I reared two specimens. In the years '25 and '26 I was unsuccessful in finding it; but in 1827, on the 22nd June and the 4th July, I took half a pint of larvæ and pupæ on the leaves of the hazel, sallow, and leaves of young oaks; but although I paid every

attention to them I only bred three males; nearly all the larvæ were infested with *Ichneumon Psyche*, mihi. On the 17th of July I again found young larvæ, but they, case and all, were not larger than this dot (.); the cases were made of the down from the under sides of the leaves. I supplied them well with food as long as leaves could be obtained; then I left them to their fate, and soon discovered that they had fastened themselves to the top of the inverted tumbler, having previously covered the sides with a fine web. About the end of March they began to stir, when I supplied them with the buds of whitethorn and sallow; they soon began to increase the size of their cases, adding to them fine sawdust and leaves cut very small. After a few weeks they fastened themselves up as before, and remained immovable; this being about eleven months since they were hatched. In a short time a great number of *Ichneumons* appeared, all quite different from *I. Psyche*. I then examined the cases, and only found in them the shrivelled skin of the caterpillar. In the month of June of the present year (1828) I met with abundant larvæ and pupæ, and collected a large box full. In the beginning of July the perfect insects began to make their appearance, but I only obtained four males and two females. I have also found them in Highgate Wood. It is past a doubt with me that the larvæ are two seasons coming to perfection. This may account for so many being stung by the *Ichneumon*.—A. INGPEN; November 24, 1828.”

“Enclosed is a wing of *Lophopteryx carmelita*. I have no doubt of it, as it agrees with the figure and description in thy work. I found it in Ongar Park, on the 22nd of April, 1828. *Thyatira batis* is by no means an uncommon insect here.—HENRY DOUBLEDAY; 5th Month 15th, 1829.”

“*Endromis versicolor* has been taken this year in Suffolk, by Mr. Kerridge, a chemist, of Ipswich.—Rev. WM. KIRBY.”

“I may mention that *Papilio (Arge) galathea* was plentiful about St. Margaret’s Bay, near Dover: this was in 1798 and 1799. In 1804 the captain of a vessel brought me a death’s-head moth, which he saw fly and settle in the sails when he was several miles from shore, near the mouth of the Bristol Channel. They are plentiful about once in seven years about Swansea.—L. W. DILLWYN; October 12, 1829.”

COLEOPTERA.

“I have lately added to my collection two splendid specimens of *Calosoma sycophanta*, and with them have heard

some interesting accounts. One of them I obtained of a fisherman, who says that he took it in his net at sea, alive, between thirty and forty miles off this coast; and upon enquiry I have heard of several others taken in the same way. The fishermen tell me that they live at sea feeding upon fish; and one man assures me that he has kept one many days which fed upon mackerel.—W. C. HEWITSON."

"We meet with *Carabus nitens* on Stockton Common, four miles from York; and *Nebria livida*, under stones, on the sea-shore to the north of Scarborough Castle, the beginning of June.—THOS. BACKHOUSE; 25th 8 mo., 1827."

"Having read in Mr. Samouelle's book that *Notoxus monoceras* is a rare insect, I write to say that I have lately taken several in a lane between this place and Richmond, called Sandy Lane; and a young friend in company with me discovered about twenty feasting voluptuously upon the body of *Meloë proscarabæus*. In addition to the former notice I may add that I caught *N. monoceros* repeatedly in the fly-net by accident, they were in such abundance.—THOS. P. HAVERFIELD; April 30, 1828."

"I may add as to *Rhinobatus ebeneus* (*Larinus carlinæ*) it occurred in great plenty last year at the edge of Collingbourne Wood (near Kimpton) the beginning of August, but I did not know its value, and so failed to secure more specimens than the two I sent.—REV. G. T. RUDD; July, 1828."

"Respecting the *Stylops* I may inform thee that I bred four specimens from a species of *Andrena*, very common here on the whitethorn in May, but do not know its specific name.—HENRY DOUBLEDAY; Epping, 9 mo. 2, 1828."

"Mr. Dale tells me that he has taken larvæ of three new species of *Stylops*, besides the species Curtis has given. He complains sadly of the past season, and seems to have done little except in *Stylops*. In Coleoptera I have taken *Licinus depressus*, twelve males and three females during last month and up to this date; I have also taken *Buprestis viridis*, three specimens; also *Elater cupreus*; *Elater bipunctulatus* was very common in the winter; also *Crioceris nigra*, Marsh. (*Eryx atra*). Mr. Dale has at length hit upon the method of breeding *Stylops*, and says that he considers it one of our commonest British insects!—REV. G. T. RUDD; Oct. 21, 1828."

"As to *Stylops* I am concerned to say that I had, by an accident, four specimens destroyed, all of which I had hoped to have sent to you. It is, however, so common an insect,

that, if we live, I can I dare say send you a dozen specimens next season.—Rev. G. T. RUDD; May 18, 1829.”

“*Licinus cassideus* was taken at Aldborough, Suffolk, in 1824. It is in the British Museum. *Epomis circumscriptus*, in meadows at Netley. *Necrophorus germanicus*, Lord Abingdon’s Wood, near Oxford.—Rev. F. W. HOPE; 1828.”

“*Hamaticherus heros*, on trunk of an elm, near Colney Hatch.—A. INGPEN; November, 1831.”

“I have been taking *Polydrosus sericius* freely, and also *Elater* (*Cardiophorus*) *thoracicus*, in Littleton Copse.—Rev. G. T. RUDD; Kimpton, June 1, 1829.”

“I take the following insects in the neighbourhood of Bristol:—*Cerambyx* (*Lamia*) *textor*, *Scarabæus* (*Copris*) *lunaris*, *Scarabæus* (*Bolbocerus*) *mobilicornis* (in Lord Clifford’s Park), *Curculio* (*Platyrhinus*) *latirostris*; and at Lundy Island, *Scarabæus typhæus* (*Typhæus vulgaris*).—GEORGE WARING; Bristol, June 21, 1829.”

NOTE.—This insect is not in the list of Coleoptera of Lundy, given in Mr. J. R. Chanter’s ‘Monograph,’ lately published.

“I find *Nebria livida* in plenty near Redcar, Guisboro’, Yorkshire; also *Dischirius nitidus* in profusion, and a species the size of ‘*nitidus*,’ but it is castaneous and opaque; *Bledius tricornis* is in profusion; *Notoxus monoceras* is also here in profusion. What have you made of the insect I sent you like *Oiceoptoma thoracica*, but with the sides of the thorax angulated? I found it at Amesbury.—Rev. G. T. RUDD; Redcar, Guisboro’, Yorkshire.”

“In consequence of the summer having been so very wet I have done very little in collecting, but have added a few insects to my cabinet, amongst which are *Apate capucinus* and *Lamia* (*Monochamus*) *sartor*. I saw at Yarmouth, in the possession of Mr. Paget, a specimen of *Tenebrio* (*Blaps*) *gigas*, taken by his friend Mr. Williams, of Ipswich, under the bark of a tree. Curtis says that Mr. Griesbach also has one.—JOSH. SPARSHALL; Norwich, October 24, 1829.”

“*Saperda ferrea* (*Stenostola nigripes*), taken abundantly here in June, 1828; but last summer sparingly; it was taken previously at Manchester.—GODFREY HOWIT; Nottingham, December, 1829.”

“I shall now mention a few of my recent captures:—*Odacantha melanura*, in plenty in the sedge boats; *Dromius sigma*, in moss, Midingley Wood, near Cambridge; *Colymbetes Grapii*, near Cambridge; *Platyrhinus latirostris*, Bath,

in *Sphœrea fraxini*; *Prionus coriarius*, Misley, near Cambridge; *Saperda carcarias*, Cambridge.—CHAS. C. BABINGTON; St. John's Coll., Cam."

"I have taken the liberty of sending you the localities of some insects:—*Pogonocherus nebulosus*, Rose Castle; *Pogonocherus hispidus*, Botchardby Mill; *Saperda oculata*, Baron Wood; *Pachyta octomaculata*, Baron Wood.—T. C. HEYSHAM; Carlisle, July 5, 1831."

"I have just finished A case of Insects that i ham going to Present it to Hir Royall Hiness Princess Victoria to solícite the feavour of hir neame as one of the peaterons of my Museum. The Insects are in a gilt freame, and the freame fitts in a Case meade in the sheape of a larege Book, full bound in red and ornemented with gold, with the jeneric and specific Neames a fixt to each, and a Peaper with the jeneric and spc. Neames ritten, and the diffrent Countys I have collected them in, and Neamed by Mr. Stephens.—RICHD. WEAVER; Birmingham, August 28, 1830; Museum, 38, New Street."

ENTOMOLOGICAL RAMBLES, 1877.

By J. B. HODGKINSON.

(Continued from p. 113.)

DURING the first week in August I captured several worn specimens of *Coccyx nanana* by beating the spruce in the Hon. F. Stanley's plantations, at Witherslack, on the bank opposite the "Derby Arms," in the afternoon sunshine. *Asychna profugella* was flying rapidly about, but scarcer than usual. There were still a good number of plumes out,—*Pterophorus plagiodactylus*, *P. parvidactylus*, *P. tetradactylus*, and *P. bipunctidactylus*; this latter is a much later species than the others: indeed last season there seemed to be no fixed time for insects appearing; they came out in driblets. The females of *Zelleria hepariella* (*insignipennella*) were now out, and would be until March following. The males of this species are soon over, though the females may be beaten out of the yews all winter, and varying from pale yellow to rich red; one most extraordinary thing is I have never as yet found a male with any variation worth note. Had I not frequently taken what should be *Z. insignipennella* in copulâ with *Z. hepariella* I might not have been so sure that they are both one species. Very few moths were

stirring; though plenty of *Crambus falsellus*, *C. geniculellus*, *C. inquinatellus*, and *C. pinetellus* are to be dislodged out of the old hollies and yews. Geometra few; Noctuæ only odd specimens. *Mamestra furva* and *Cerigo cytherea*, &c., beaten out from under the banks. I did not try sugaring, having to be careful about rheumatism; but during the afternoon sunshine *Dicrorampha acuminatana*, *Gelechia atrella*, *G. gemmella*, and *G. anthyllidella* were flying actively about; and odd *G. junctella* got up; this species still keeps very rare, and is one of this genus which hibernates.

During the whole of August and September little or nothing of importance turned up amongst imagos. Most of the time was employed in larva hunting, chiefly for *Nepticula*; and among the larger species I met with several *Cucullia asteris* larvæ on the golden-rod, and also on the China-aster. The first I found were in a garden. I had a strange adventure with a *Cucullia gnaphalii* larva: I let one feed on a plant of the golden-rod in my room, subject to no other confinement; it never offered to leave the plant for a fortnight; but when I had been absent for three days, on my return my "shark" was gone. I looked everywhere in the room, still hoping it would crawl out of some corner, until at last it was given up. Several days after, my servant was making her bed in another room some distance away, when she brought my lost one back, having found it under her pillow, apparently preparing to change. After that it was put under restraint; and I expect to see it creep up shortly out of my flower-pot in another form. I met with an *Acronycta alni* larva at Grange, as did Mr. Threlfall; mine was sickly, and looked as if it was ichneumonised. Of *Botys terrealis* larvæ I got a good supply, but it is a most difficult species to rear. I find it best to let them ramble about in my room, and go to pupa where they please, for the moths always go to the window. It was very lucky that I took all I could find on all the plants in one locality, for the railway company are making invasions on a special corner, where both *B. terrealis* and *Eupithecia denotata* larvæ are; and where the latter might be found in scores on the seeds of *Pimpinella saxifraga*: some of the larvæ were green where the seeds were green; and, later in the season, when the seeds were brown the larvæ were chiefly brown; evidently a provision for self-protection. On visiting this special corner recently I found it was covered and filled up with some twenty feet of soil, and railway rails laid over the spot. There are also

large mansions being built on my *Aspidiscana* ground. One by one my happy hunting grounds disappear; and we have to go forth again to find "fresh woods and pastures new."

I had long wanted to see the larva and case of *Coleophora melilotella*; so during the first week in September Mr. Threlfall and I set off for Darlington. After a five hours' railway ride we found ourselves at Barnard Castle; and having missed Mr. Sang we strolled into the town, and found a bird-stuffer who had only about a score of moths; and how odd that one should be a fine *Sphinx convolvuli*, and another the handsome little *Anesychia funerella*. That evening we put up with Mr. Sang; and next day he took us on to the railway bank and showed us how to find the cases of *C. melilotella*, which are by no means easy to find: it is just like the dark seeds of the *Melilotus*; and now and again three cases would be sticking end to end. There we saw several larvæ, which Mr. Sang picked up for us to show how they fed, such as *Nepticula cryptella*, *Gelechia intaminatella*, &c. On the day following we all three went to Highforce, Middleton-in-Teesdale, some twenty-five miles from Darlington, and found a number of larvæ of *Coleophora Wilkinsonella* and *C. paripennella* on the birch. The rains had beaten everything down. We went specially to look for the rare *Acrolepia betuletella*, but it was no use; though every little moth we beat out was soon caught. The best were *Mixodia Ratzburghiana*, some in fine condition. These ought to have been out in July.

We parted with Mr. Sang at Barnard Castle, having spent three days greatly to our advantage in knowledge. Nothing surprised me more than to see that such an unentomological looking district had yielded so many novelties as Mr. Sang had turned up, such as *Gelechia solutella* (a Rannoch species) and *Elachista paludum* (a Norfolk fen species); but it is the old adage which stands as good as ever,—“He who works will win.”

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR'S 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from p. 147.)

89. *Cynips caput-medusæ*, Hart.—This remarkably fine gall first appears with the opening of the fruit buds in May. In the neighbourhood of Vienna it occurs in such numbers

on the young twigs of *Quercus sessiliflora* and *Q. pubescens* that they are often bent down by them. A thick disk is developed on one side of the cup, the edge of which is at first surrounded with small conical projections, but the upper surface very soon becomes covered with numerous, more or



Fig. 89.—Gall of *Cynips caput-medusæ*, and cup with the inner gall.

less bent, red thread-like growths, which are pointed at the ends, and bear a great resemblance to the tentacles of a sea-anemone (*Actinia*). In some cases the disk does not widen, but the edges are turned inwards towards the base, whilst the protuberances grow on, and numerous thread-like side branches are produced, which spread themselves in all directions, so that the disk becomes quite hidden, and when the gall matures scarcely more than these are noticeable. In the centre of the disk there is transversely a thin-walled, single-chambered inner gall, which is separated from the surrounding gall substance when ripe. Several galls often grow so near together that they appear like a single gall, as large as a man's fist. The galls become mature at the beginning of winter, and during the cold season a great many fall off the trees, but many remain. From both the flies appear in February: these are best to be obtained by collecting the inner galls at the end of January.—G. L. MAYR.

We now come to the sixth and last division, namely, the fruit-galls,—those species which produce galls either on or in the fertile flower, or acorn. It is doubtful whether any of

the four or five European species occur in Britain. The fine Bedeguar-like gall, now under notice, would certainly be recognised, and it is unrecorded; but if it has been found the beautiful figure may recall it to mind. No less than four species of *Synergus* are known to make a home of this gall, amongst others; *Olynx trilineata*, Mayr, and the two common species of *Megastigmus*, viz. *M. stigmaticus* and *M. dorsalis*, are parasitic in it.—E. A. FITCH.



Fig. 90.—Gall of *Cynips calicis*, and in section.

90. *Cynips calicis*, Burgsdorff. — The well-known “Knopper”—which occurs on *Quercus pedunculata* and, according to Schlechtendal, also on *Q. sessiliflora*—is the nearest relation to the above-described species. The gall appears at the beginning of summer, between the acorn and the cup, at the bottom of the latter, forming at first an inverted cone or a thick disk, which becomes hemispherical by degrees; it is strongly ribbed radiately and compressed at the side, a rounded papilla appearing at the apex. The margin of the disk, however, soon becomes more and more curved downwards, and the involucre more or less surrounded. There is a hole at the central point from which the radial striæ emanate, and which corresponds to the apex of the gall: this is the mouth of a cavity, which is divided from a second cavity at the base of the gall by a transverse partition. This inferior cavity contains the single-chambered inner gall, apparently loose. The gall-fly leaves the inner gall in February or March, and eating through the above-mentioned partition makes its exit by the hole opposite the base of the gall.—G. L. MAYR.

The Knopperrn galls do not occur with us; five species of *Synergus* and *Megastigmus stigmaticans* are connected with them. Like the gall-maker all are to be bred in the spring and early summer of the second year. The economy of *Synergus vulgaris* in this gall is interesting.—E. A. FITCH.

THE GREEN FIELD-CRICKET (ACRIDA VIRIDISSIMA).

By W. G. TENANT.

ON August 14th, 1876, a friend gave me a male specimen of this interesting and handsome insect. I made a house for him—consisting of a box, the top of which, instead of having a lid, was nearly covered by a pane of glass—for the purpose of observing his habits; over where the glass did not cover I fastened a piece of perforated zinc, thus admitting both light and air.

Amongst his habits, which under these circumstances did not seem to be multifarious, the commonest one was the licking of his tarsi, which, by the way, I suspect was often done for the purpose of making a sure footing in walking; and especially would he do this while walking, body inverted, on the under side of the glass cover of his house, for I observed that when he apparently failed to adhere to the glass, and he was in danger of falling to the bottom, then he would lick the tarsi; after which he was enabled to pursue his course in safety. So often as the tarsi appeared to fail to adhere, so often did he place them in his mouth; and from this fact I have very little doubt but that the secretion with which he moistened them enabled him to walk, body inverted, with safety. I can hardly suppose it was so often done for the purposes of cleanliness only.

He was ravenous at times, killing and eating a moth (*Tryphæna pronuba*), though, so far as I observed, he never seemed to notice their presence, and only attacked them when they approached him. With his mandibles he scooped out the contents of the abdomen, seldom mutilating to any extent the integument. A mischievous urchin placed a humble-bee in his cage, which I allowed to remain, though not with any easy mind, being afraid it might sting and hurt the cricket. Very soon afterwards, however, I was surprised to find the bee lying helpless at the bottom of the cage: how

it had become so I did not know ; but I had seen the cricket strike the bee when it fluttered near him ; yet I hardly imagine those blows were sufficient to render it *hors de combat*. Some little time after the cricket inserted his mandibles in the abdomen of the bee, and, having succeeded in abstracting the honey-bag, forthwith proceeded to eat it, leaving the bee still alive. I allowed the bee to live two or three hours, thinking the cricket would return to it to eat the contents of the abdomen ; but he did not ; and finding he had no apparent intention of so doing, I killed the bee. Butterflies he was immensely fond of, allowing them to live very little time after being placed in his cage. In no instance, however, did he eat the wings and head of either moth or butterfly. He lived until September 25th.

Two days after the cricket died a lad took it out of its cage, where I had allowed it to remain, and began handling it. Boy-like, and for no other purpose but pleasing himself, he expanded its elytra, and then by the application of his fore finger and thumb compressed them sharply. I was surprised to hear a distinct chirp,—a more distinct one than which the cricket himself could not have produced had he been alive. I repeated the act, succeeding at will in producing the chirp. This led me to examine the elytra to ascertain, if possible, how the chirp was produced, and with the following result :—

On the upper surface of the under wing-case will be found what may well be compared to the head of a drum : its appearance is vitreous, and it is surrounded by a membranous ridge ; on the under surface of the upper wing-cover a depression exists, showing where this so-called drum-head meets the upper wing-cover when the elytra are closed ; anterior to this depression is a ridge so set that, while the elytra are being closed, it chafes against the anterior left and free end of the under wing-cover. This chafing or friction produces the chirp. The edging of the under wing-cover where this friction takes place appears to be composed of the same membranous substance as the ridge of the upper wing-cover, just mentioned.

My opinion is that the chirp is produced by a rapid closing of the elytra, and not by their expansion ; and if this be true it will account for the chirping not being one prolonged sound (as in the case of whistling), even when the cricket is chirping its loudest and fastest. That the cricket moves its elytra when so doing is without doubt correct ;

and Mr. Robert Laddiman, of this city, assures me that he has repeatedly observed this action. As the ridge upon the under surface of the upper wing-cover, when the elytra are closed, rests in a position anterior to the before-mentioned drum-head of the under wing-cover, it would appear that the membranous ridge surrounding the glassy surface of the drum has not by any friction of its parts anything to do with the production of the chirp; and I think it probable the drum-head is an apparatus for the reflection of the chirp-sound in any direction, and at the will of the cricket, for it is well known that the insect is not always to be found in the spot from whence its chirp appears to proceed. As the male bird sings for the delectation of the female and to attract her attention, so undoubtedly does the male cricket chirp; for the female cricket possesses no such apparatus as I have described, and as far as I can ascertain does not chirp.

As the time is at hand when this beautiful insect is in full vigour of life and song, and may be easily obtained, it would be well if some of the readers of the 'Entomologist' would secure specimens, and see if they can or cannot substantiate my foregoing remarks on the singing of *Acrida viridissima*.

Upper Rupert Street, Norwich.

NOTICE OF BOOK.

The Natural History of Hastings and St. Leonards.

Published by Hastings and St. Leonards Philosophical and Natural History Society, 1878.

THIS little work consists of a mere list of names of all kinds of animals and insects which have been observed in the neighbourhood of Hastings, both on land and in the sea. Excepting that it gives the relative abundance, or scarcity, of each species, it is little more than a mere list of names, without localities or any information which would be of use to the comparative naturalist. Nevertheless it forms a good basis upon which to found more useful work. The order Insecta occupies about twenty-four pages out of sixty; and all orders seem to have been fairly worked out.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LIFE-HISTORY OF *DEIOPEIA PULCHELLA*.—The history of this beautiful species, as given in our English works on Lepidoptera, being only a short and imperfect account, copied from continental authors, and as I have just been favoured with the rare opportunity of rearing this species from the eggs (for the first time, I believe, in England), the following notes may be interesting. The eggs were most kindly sent me by Mr. Joseph Sidebotham, who had been staying for some months at Mentone, Alpes-Maritimes, in which locality he had the pleasure of seeing *Deiopeia pulchella* on the wing, in October, 1877, when he got eggs, which duly hatched, but the young larvæ refused all kinds of food offered to them. During May, this 1878, the imagines again appeared, and Mr. Sidebotham secured some eggs, which he sent to me by post to try my fortune with them. They reached me May 24th, and some of them had hatched *en route*. The remaining eggs produced larvæ the day of arrival. Mr. Sidebotham writes to me:—"I find *Pulchella* round here (Mentone), from the sea level to an elevation of one thousand feet, at which height it is found on the rosemary, a large white-flowered *Cistus*, or rock-rose, and on pine trees; at the sea level, where it is more abundant, it frequents myrtle, *Trifolium stellatum*, *Cytisus scorparius*," &c. Here too, in England, it shows a partiality for the coast, a few occurring most seasons along the south-west coast, from Kent to Devonshire. When first hatched they are of a dull orange-colour, slightly hairy, sluggish, and of rather a maggot-like appearance; the head is small and black. The first casting of skin was on June 3rd, when they became darker coloured, and of a greenish black tint, the segments being well defined, a transverse dull orange band and six black spots on each, and a few black bristly hairs. The second moult, *i.e.* on third skin, the transverse orange bands become less defined, and an interrupted chain of white dorsal spots appear; these spots are of varied characters, largest in the centre of each segment, decreasing both anteriorly and posteriorly, and a spiracular line also appears of a whitish gray colour, the spiracles being of a dull orange. About June 17th the third and final moult took place; and in this stage they varied very much in different individuals. By taking the most marked forms, or varieties, you might

roughly describe the darkest type as a black larva, with an interrupted chain of white dorsal spots, and with a more indistinctly defined whitish spiracular line; whilst the paler type might not inaptly be called a creamy white larva, with transverse bands of markings: these transverse bands are composed of a fine dull orange band (quite lost in the dark form), bordered on either side by largish black dots, just touching on their outer margins, four of these spots being larger than the rest; two on either side of the orange bands are on the dorsal area, and by the strong contrast of jet-black on the creamy white ground form the broadish, irregular, chain-like pattern of the dorsal area; smaller black spots, with a little gray shading, produce a faint spiracular line; the spiracles being dull orange, which on the anterior segments show rather more of the orange colour. The larva is thinly covered with stiffish hairs; those of the dorsal area being black, and those of the spiracular area white. The ventral surface is dull lead-colour in all of them. When full grown they measure one-eighth of an inch, are moderately stout, slightly thickest in the middle, decreasing a little to each extremity; the head is rather small, and of a mottled brown colour; the segments are well defined. As to treatment—when first hatched I placed them in a wide-mouthed bottle, and tried them with a variety of likely plants; and I had the satisfaction of seeing that they ate a garden variety of *Myosotis*, and also *Borago officinalis*; by preference the former plant, but being an early flowering species it was getting out of flower and much covered with *Aphis*. I tried them with the common forget-me-not (*Myosotis palustris*), of our brooks, and they took to feeding on it at once, eating both flowers and leaves, and throve well. They were full fed from June 24th to 30th, when some of them commenced spinning a fine white silky cocoon on the surface of the ground, introducing a few grains of earth, &c., into its composition, so as to give it the character of surrounding objects, doubtless for protection. Others spun in like manner. Three of them spun a fine white web amongst the food-plant, through which could be seen the moderately stout, reddish brown pupa, showing a slight indication of the spots on the abdominal surface of the imago. The first imago appeared, July 16th, a fine female; another on the 17th; and a very large male on the 18th. The coloration of the first is extremely bright, the crimson spots being both large and deeply coloured. In the two last the crimson is less bright,

and in fact quite of our English type, allowing for the fine condition of being freshly bred. Should any fortunate collector meet with a female *Deiopeia pulchella* on our English coast this year, I hope he will give her a chance to supply him with some genuine "native" eggs before consigning her to the cyanide bottle; and then possibly my experience may help him to success with them.—WILLIAM HENRY TUGWELL; 3, Lewisham Road, Greenwich, July 18, 1878.

ACHERONTIA ATROPOS.—In August and September of last year I had a dozen larvæ of *Acherontia Atropos*, all of which were found feeding on potato-leaves. The ground colour of the whole of them was green. In due course they turned into pupæ, and with the exception of two went down into earth, finely sifted and placed in flower-pots for their especial behoof. The two alluded to refused to bury themselves, and underwent their metamorphosis on the top of the earth, one of them emerging an imago in November. This was a very noisy insect, squeaking loudly in the three stages of larva, pupa, and imago. The other, though the moth was perfectly formed, died in the pupa-case. November passed, and December, and I then gave up all hope of seeing any more autumnal specimens. I knew from experience what a troublesome creature the moth is to rear; and many of my entomological friends gave me little encouragement as to their appearing in the spring. However, I did not despair; but kept the breeding-cage, in which I had put the flower-pots, before the kitchen fire. April came and no moths; therefore I determined to turn them all out and satisfy myself whether they were alive or dead. Fortunate resolution this: I found the earth, which I had taken such pains to pulverise, cemented into a hardness rivalling a macadamised road. Alas! one poor moth had burst from the pupa, only to perish miserably in its "living tomb," the mould being so hard that it could not possibly push its way to the top. It would have been a splendid insect, judging from the size of its body. I then carefully examined the others, two of which I discovered were dead. The remainder I took up and laid in moss, and still kept before the fire. About the middle of June, when the weather became intensely hot, I carried the cage into the greenhouse, thinking that the sun's heat would be better than artificial. A few days after, namely, on the 18th of that month, great was my delight to find a fine male had emerged. Of course I then paid not only daily, but frequent, visits

to the cage; and on the 23rd found another male. The next day a large female emerged; on the following day, another male; on the 28th, another male; on the 29th, another, a male likewise. My last specimen was delayed by the sudden change in the weather till the 5th of July, when it came out; making the sixth male, and eighth fine specimen. Each of these insects squeaked loudly,—louder than a mouse when a victim to the tender mercies of a cat.—JOSEPH ANDERSON; jun.; Chichester.

ANTICLEA SINUATA AT BOX HILL.—On July 21st, whilst collecting at Box Hill, I was agreeably surprised at beating a fair specimen of *Anticlea sinuata* out of a box tree.—A. W. PRIEST; 16A, Merton Road, Stamford Road, Kensington, July 22, 1878.

RARE TORTRICES THIS SEASON.—While collecting near Leatherhead on April 27th last, in company with Dr. Gill, I captured a specimen of *Spilonota pauperana* flying in the sunshine over wild rose bushes; it was slightly worn, and its late appearance was probably the reason why I failed to find any more: so far as I am aware this is the first record of the capture of this local species in Surrey. On May 25th, at Tilgate Forest, I took one *Ephippiphora ravulana*: the day was very showery, and this was almost the only insect to be seen during a passing gleam of sunshine. I have succeeded in rearing a few *E. gallicolana*, and have also taken two specimens of this species, which I consider to be identical with *E. obscurana*, though I must postpone my reasons for this decision to a future number.—WALTER P. WESTON; 1, Duncan Terrace, N.

GELECHIA GERRONELLA BRED.—I have bred two specimens of this from larvæ collected in furze bushes, near Snaresbrook Station, in the early part of June. They came out amongst a number of *Grandipennis* at the end of June and beginning of July. I subsequently went over to the place, and beat from the furze ten good specimens of *Gelechia gerronella*. *Anarsia spartiella* and *Cemiostoma spartifoliella* were both common.—W. MACHIN; 22, Argyle Road, Carlton Square, E., July 18, 1875.

RHODOPHÆA CONSOCIELLA AT ARNSIDE.—A month ago, when looking for larvæ of *Penthina incarnatana*, I noticed the young oaks all crumpled up in a form I had not seen before: I thought they could not be the common Pea-green, *Tortrix viridana*, but that possibly they might be knot-horn larvæ; however, I sent two to Mr. Barrett for an opinion. As he

sent none I concluded they were some common thing after all. I had filled my inside pockets with leaves; and judge of my surprise when *R. consociella*, but many of them crippled, began to appear in my room. I wetted all the leaves again, and bred about thirty-five specimens. This is the first occurrence in the North of this insect.—J. B. HODGKINSON; 15, Spring Bank, Preston, July 17, 1878.

INCURVARIA CANARIELLA BRED.—I have bred several specimens of this rarity from *Rosa spinosissima*, which I found at Arnside. This is the only English locality; but it has also occurred in the Isle of Man, where my old friend Hague, of Staleybridge, first took it twenty years ago. This new district of Arnside has, as I expected, shown up well, being a high hill above the sea; but as the wind is always blowing, more or less, it gives one a poor chance of collecting.—Id.

DESCRIPTION OF THE LARVA OF BOTYS ASINALIS.—On May 11th, 1876, I received through the kindness of Mr. A. E. Hudd, of Clifton, Bristol, half a dozen larvæ of this species. Two of them were full grown, and were an inch and an eighth in length; the middle segments plump and round, but each becomes smaller than its predecessor from the middle to the extremities, giving the body a strongly attenuated appearance. Head broad when seen from above, but narrow when viewed from the side; the lobes rather rounded and polished. Body irregularly cylindrical, each segment tapering towards its edges, and thus rendering the divisions very conspicuous; each segment is also further divided into two parts by a central transverse groove. Skin soft and semitranslucent, clothed with a few short hairs. The last pair of prolegs are extended in a >-like form beyond the anal segment. Ground colour dull pinkish brown (brighter in young specimens): head straw-colour, marked with darker brown; dorsal stripe pale pinkish yellow, intersected throughout with a dark olive-brown line; sub-dorsal stripes also pinkish yellow, broadly bordered above with olive-brown; indeed, this dark colour forms a broad stripe between the dorsal and subdorsal lines; spiracles and trapezoidal dots distinct, black; ventral surface, legs, and prolegs, grayish green. The skin is so transparent that the movements of all the muscles can be distinctly seen. Feeds on *Rubia peregrina*; and in some seasons the larvæ are so abundant in the neighbourhood of Bristol that the conspicuous marks made by them on the madder plants form quite a

feature in the locality.—GEO. T. PORRITT; Highroyd House, Huddersfield, July 4, 1878.

NOTE ON PROTECTED COLEOPTERA.—To the list of specially protected insects we may, I think, venture to add *Pyrochroa coccinea*. Several specimens which I have thrown to poultry have been decidedly rejected: its boldness is as well-marked as its coloration is striking. It is, by the way, a destroyer of *Aphides*; and so are *Malachius æneus* and *M. bipustulatus*. A few days ago I was hastily called to look at a "wasp without wings," which had been imprisoned under a tumbler. It proved to be a large specimen of *Clytus arietis*. The boldness of this insect, and its indifference when a hand is put forth to seize it, as I have frequently remarked this season, show that its wasp-like coloration proves, under ordinary circumstances, a sufficient protection. In this respect it differs strikingly from *Callidium violaceum*, a common species here, which on the least approach of danger disappears round the post, rail, or branch, upon which it is sitting, with admirable neatness and speed. My experiments show that it is not protected by any repulsive odour or taste, as it is readily devoured by birds.—J. W. SLATER; 3, Bicester Road, Aylesbury, July 6, 1878.

ON PARTHENOGENESIS IN THE TENTHREDINIDÆ.—The result of the experiment recorded by Mr. P. Cameron (Ent. Mo. Mag. for June last) induced me to try the same experiment with another sawfly, *Eriocampa ovata*, which enables me to corroborate the result obtained by that gentleman. When I saw the article above alluded to I determined the first opportunity to try the same myself; as I had several bottles containing sawfly pupæ I had not long to wait. I keep these bottles in my bed-room: on getting out of bed on June 23rd I looked at the bottles; there were no sawflies in any of them; but before I had finished dressing a female was crawling up the side of one of the bottles, which I immediately boxed; and a few minutes afterwards another, which I likewise boxed. Having secured them in separate boxes I went out and procured a spray of alder; this I got from a cold sheltered spot, with a north aspect, as being least likely to have the leaves already punctured by sawflies. I put the sprig of alder into a bottle of water, and that under a bell-glass; I then tried to put the two female sawflies under it, but as it was in the sun, and on a very hot day, they were very active, and one of them escaped, for which now I am not sorry; the other no sooner flew on to the leaves than she

began to lay, or at least puncture the leaves: this she did in the following manner:—she walked slowly about the leaf, restlessly feeling the surface with the end of the sheaths of the saw; this she did by continually drawing the saws to her by bending her abdomen; when she was satisfied with the spot, the saws were lowered nearly at right angles to the abdomen; a starting point was evidently then made; after which the body was turned on one side, and the saws gradually forced sideways into the leaf, until the abdomen reached quite close to the surface; she then remained quiet a very short time, and gradually withdrew the saws again: it seemed to me that the blades of the saw were opened before and whilst being withdrawn, exactly in the same manner as a glove-stretcher is used; the motion of the saw whilst puncturing the leaf was a succession of short pushes, and a very slight withdrawal before each push; the operation took somewhere about half a minute; the eggs were laid, or at least the punctures were made, in quick succession. The fly died about the middle of the week, most probably from starvation. When the leaf was punctured the entrance of the hole could clearly be seen with the aid of a glass; it had the appearance of a small bruise. On Friday when I went to give the alder more water I noticed that some of the leaves were covered rather thickly with brown spots. On the evening of June 30th, on going again to water the sprig, I was struck with the appearance of the leaves; and on using the lens I found that the eggs had hatched, and young larvæ were crawling about the leaves. The brown patches were now in holes, having been eaten through. Of course it is just possible that the leaves may have had the eggs deposited in them before I cut the sprig, but from the situation from which it came I do not think it likely; or at least if an *Eriocampa ovata* should have laid its eggs in the leaves, I do not think she would have laid so many in a leaf as there are in the leaves of my sprig. To be quite sure, in such a case, the alder should have been protected from any chance of visitation from a strange sawfly before the experimental one was introduced; still I feel perfectly satisfied myself with the results of the experiment. I may say I have not yet met with the male of *Eriocampa ovata*; and I am quite positive this female never saw one. Since the above was written the leaves got rather dry in the night, and most of the young larvæ left the leaves, and as these were not covered they escaped.—JOHN B. BRIDGMAN; Norwich, July 3, 1878.

THE ENTOMOLOGIST.

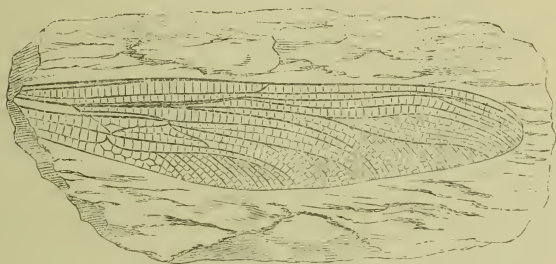
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[No. 184.]

NOTES ON A FOSSIL WING OF A DRAGONFLY, FROM THE BOURNEMOUTH LEAF BEDS.

By H. Goss, F.L.S., F.G.S.



Right fore wing of a Species of *Libellulidæ*.

THAT insects made their appearance at a comparatively early period of the world's history is proved by the vast antiquity of the oldest geological formations in which their remains have been discovered; and the researches of the geologist and palæontologist have furnished conclusive evidence that ages before the existing families of the Vertebrata had come into being most of the family types of the Insecta were abundantly represented, and had obtained a wide geographical distribution.

It may, at first sight, seem almost incredible that the remains of any animals of so delicate and fragile a nature as insects could be preserved for centuries in a sufficiently perfect state as to be recognisable at the present day. Not only, however, have the wings and wing-cases of thousands of insects been discovered in such a state of preservation as to admit of their identification with those of existing orders,

families, and genera, but in many instances—from the nature of the matrix in which they have been embedded, or the circumstances under which their deposition and petrification took place—they have been so perfectly preserved as to enable an entomologist to pronounce with some degree of certainty as to the species to which they belonged.

The Coleoptera are, of course, from their nature, much more capable of resisting the effects of air and water than insects of other classes; but even the delicate wings of Neuroptera, Hymenoptera, and Diptera, are sometimes preserved in great perfection. From the fragmentary and imperfect state, however, of many fossil insects, it is evident that they have not all been embedded under similar conditions, or under circumstances equally favourable to their preservation; and numbers have, prior to their deposition and subsequent petrification, apparently been blown about by winds, or remained for years soddening in water. That insects are capable of resisting for a lengthened period the effects of air and water has been proved by actual experiment; and Dr. Hagen states that he has kept the wings of dragonflies in water for years without observing the slightest change in their texture.

In the course of last year and the year before last, Mr. John Starkie Gardner, F.G.S., who is studying the fossil flora of the Bournemouth leaf beds, belonging to the Bagshot Sands (Middle Eocene), discovered numerous fossil insects in these beds, associated with the plant remains which were the especial objects of his search. These insects, which Mr. Gardner has been good enough to lend me for examination, are principally Coleoptera (*Curculionidæ*, *Buprestidæ*, &c.) and Neuroptera. Amongst the remains of the last-named order, the best preserved and most interesting specimen is the right fore wing (figured above) of a species of *Libellulidæ*. On first examining this fossil I was doubtful whether to refer it to the genus *Libellula* or the genus *Æschna*; but Mr. C. O. Waterhouse, after carefully examining it and comparing it with specimens of existing species of *Libellulidæ* in the collection of the British Museum, decided that it belonged to the genus last named (*Æschna*). It will be seen from the figure that the wing is in a very fine state of preservation, its delicate reticulation being as perfect as that of a living dragonfly.

The species to which this dragonfly belonged has doubtless been long extinct; and its nearest living allies would probably

be found in tropical or subtropical countries, the climate of which more resembles that prevailing in this country at the period when this insect existed. That a much warmer climate then prevailed in this country than is at present enjoyed is evident from the plant remains of these leaf beds, which, according to Lyell, "remind the botanist of the types of tropical India and Australia."

The Avenue, Surbiton Hill.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. X. NYMPHALIDÆ—NYMPHALINÆ. Genera allied to VANESSA.

THE first genus, *Araschnia*, contains the smallest European species of the group, *A. Levana*, Linn., remarkable for the dissimilarity of its broods. It is popularly called the "Map" in France and Germany, perhaps on account of the sharpness of its markings. One or two other species have been described from North-eastern Asia, but are perhaps not truly distinct.

The next group, *Symbrenthia*, is East Indian, and includes a few black species, banded with rich tawny. The fore wings are marked with a band in the cell, and a short oblique one across the tip; and the hind wings (which are angulated, and have a strong projection in the middle) have two bands, the uppermost continued across the hinder angle of the fore wings. *S. Hypoclus* has a tawny under side, with a reddish brown oblique stripe running from the middle of the inner margin of the hind wings towards the hind margin of the fore wings; towards the tail it is dusted with pinkish gray and greenish. *S. Hypselis* is of a richer tawny above, and pale yellow, more or less varied with orange, and reticulated with black below; towards the hind margin there is a row of large black conical spots, bordered with yellow and black, and dusted with metallic-green. The species expand nearly two inches.

The genus *Hypanartia* is South American or African, and the species expand about two or two and a half inches; the fore wings are generally slightly truncated at the tips, and sometimes concave below; and the hind wings are produced into a short tail. Several species, such as *Lethe*, *Godmani*,

and *Zabulina*, are tawny or fulvous, with the tip of the fore wings broadly black; in *Lethe* the tip is spotted with fulvous, and in the others with white; but the fulvous portion of the fore wing is divided by an oblique black band in *Zabulina*, which is not the case in *Godmani*. *H. Kefersteinii* is dull reddish instead of fulvous, with white spots on the black tip; and *H. Dione* is dull yellowish brown, with transverse black stripes, and a small, oblong, transparent spot in the middle of the fore wings, and one or two transparent dots nearer the tip; on the hind wings there are one or two black spots, scaled with blue towards the hind margin. *H. Hippomene*, from Natal and Madagascar, exactly resembles a small orange-banded *Pyrameis Atalanta*, with tails.

The species of the first section of *Vanessa* (*Grapta*) are most numerous and varied in North America, where the larger species, such as *Interrogationis*, expand nearly three inches. The Japanese *V. C-aureum* has the inner of two marginal dark bands on the hind wings dusted with blue. The typical section of *Vanessa* is common in Europe, Asia, and North America, but is not numerous in species, and most of them closely resemble our own *Urticæ* and *Poly-chloros*; but the Mexican *Cyanomelus* is wholly bluish green; the East Indian *Charonia* is greenish black, with a broad greenish blue submarginal band on all the wings; the Japanese *V. No-Japonicum* resembles this, but the band is narrower and bluer, and there is a large white spot on the costa of the fore wings, followed by a small one nearer the tip. The North American *V. Milberti* resembles *V. Urticæ*, but has only a submarginal tawny band on all the wings, which is bifurcated on the costa of the fore wings; the latter are also marked with two reddish spots in the cell.

The genus *Pyrameis* is also represented in all parts of the world, but by very few species, most of which resemble our own common European species. All the American species (*Atalanta* excepted) closely resemble our own *Cardui*, from which the common North American *P. Virginiensis*, Drury (= *Huntera*, Fabr.), may be distinguished by the under side of the hind wings, which is reticulated with yellowish, and marked with two large eyes only. *P. Carye*, which is common throughout Western America, more resembles *Cardui*, but is smaller, with fewer black spots towards the tip of the fore wings. The Royal Dublin Society has a specimen of *Carye*, marked "China;" which is probably an error. I record it, however, as the occurrence of

this species in China is not impossible, and, if confirmed, would be a matter of some interest. The Brazilian *P. Myrinna* resembles *P. Virginiensis*, but is much more richly coloured, and the space occupied by the submarginal eyes on the upper surface of the hind wings is filled up by a broad brown band. Of the species allied to *Atalanta* the most interesting are *Indica*, Herbst. (*Callirhoe*, Hübn.), from the East Indies and Canaries, which resembles a pale *Atalanta*, with a broad tawny band on the fore wings, marked with three black spots on the inside; *P. Gonerilla*, from New Zealand, which has a broad red band on the hind wings, marked with four black eyes with blue pupils; and *P. Tammeamea*, Esch., a large and richly-coloured species from the Sandwich Islands. *P. Itea* is reddish or greenish tawny at the base of the fore wings and on the hind wings, except at the costa and hind margin; the basal colouring of the fore wings is bounded by a very large, oval, yellow spot; the rest of the wing is black, with some small white and yellow spots near the tip: it is an Australian insect, and resembles no other species.

I have not been able to complete the subject of the genera allied to *Vanessa* in the present paper, and shall have to resume it in the next.

NOTE ON CERTAIN INSECTIVOROUS PLANTS.

By G. B. CORBIN.

It is well known that the above subject has excited some considerable degree of interest within the past few years, and especially since the publication of Mr. Darwin's book treating of the subject. Few readers of the 'Entomologist,' especially those who have visited the New Forest, are unacquainted with the insectivorous properties of the sundews (*Droseraceæ*), and the tenacity with which the viscons matter exuding from the glandular hairs, with which the leaves are encircled, entrap and hold the unfortunate insect that comes within reach. These are not of the smaller kinds only, but sometimes—as my friend the Rev. H. M. Wilkinson informs me—insects as large as a dragonfly are caught, and their juices assimilated to the plant's well-being; or, again, the butterwort (*Pinguicula*) acts in a somewhat similar manner; whilst in the water the bladderworts (*Urtricularia*) have an equally wonderful property of entrapping small water-slugs and insects, and, as Mr. Darwin propounds, thrives upon such

fare. Certain it is that small creatures are often found inside the bladder-like processes with which the last-named wonderful class of plants are provided; but how much the presence of the insects in such a situation contributes to the plant's well-being I leave for others to judge. In the case of the sundews it is very evident that the plant absorbs or digests the softer portions of the imprisoned insect, as the dried and rejected skeletons may sometimes be found almost covering the leaves, and the so-called digestive properties of the plant may be proved by placing one insect within its grasp, and killing another insect of the same species and placing it out of reach on some object near. It will be seen that the insect upon the sundew is skeletonised and sucked dry in a comparatively short space of time, whilst the other dries in the same manner as our cabinet specimens. In the instances above cited the insects seem to have been the unwilling prisoners of the plants retaining them; but other instances have come under my observation where the insects appear to have voluntarily settled upon the plant and died.

A few years ago I saw a plant in the New Forest, some species of dead nettle, with many insects attached to its leaves; and last year, in Devonshire, I saw a somewhat similar occurrence, only that the plant was, I believe, akin to the mullein. The leaves of the plants in both cases were beset with vegetable hairs, and the insects might have been partly detained by them, but they were as perfect as any in our cabinets. But the most remarkable instance, which induced me to begin this note, came under my observation last July, as follows:—I was strolling in the meadows by a broad ditch where an abundance of plants common to such situations were growing, as figwort (*Scrophularia*), hemp agrimony (*Eupatorium*), mugwort (*Artemisia*), &c., and my notice was attracted to the number of flies that were settled upon the last-named plants; and on making a closer inspection I was much surprised to find most of the insects were dead. These were attached to the plants in various situations, but in many, if not in all, cases the insect seemed to have settled thereon from choice; some had clasped the points of the leaf, whilst others seemed to hold the smaller stems of the branch in their embrace. Many of the insects were quite perfect, but others were broken from the motion of the plants caused by the wind. At first I thought the smell of the plant had attracted and killed them; but has it ever been proved that this plant is in any way poisonous to

insect life? The most remarkable part of this case is that the insects were to be seen only upon the mugwort, and this only for about five or six yards in extent, whilst other plants growing in the vicinity were free from them. It is true I saw a few scattered individuals upon plants of mugwort outside this "charmed circle," but within the space above indicated I saw thousands of defunct Diptera and other insects. I picked some portions of the plants, and showed them whilst fresh to Mr. Wilkinson, who, no doubt, can vouch for the correctness of what I describe. It must be understood that the insects I saw had not died from the attack of a fungoid growth such as we sometimes see, but they appeared to be quite fresh, and for the most part perfect. Has any other similar occurrence come under the notice of other readers of the 'Entomologist,' and if it has, what cause, or combination of causes, was supposed to have led to such an effect? I may mention that the majority of the insects I saw belonged to the yellowish brown looking creature (*Scatophaga stercoraria*) so commonly found on cow-droppings, and the like; but this to me was not so very peculiar, since the insect must be as common, or even commoner, than any other in a locality where cattle were continually grazing.

Further notes on this subject from other localities would, I am sure, be interesting to others as well as myself.

Ringwood.

MICRO-LEPIDOPTERA BRED, 1877 AND 1878.

By J. H. THRELFALL.

THE larvæ of *Gelechia viscariella* were very abundant in the tops of a *Lychnis* at Wyre, and in various localities near Preston, during April and May, 1877; but this year they are almost entirely absent; and, strange to say, the plant itself is very scarce where last year it abounded. The perfect insects emerged in limited numbers during July, the pupæ being very much infested with ichneumons.

On May 13th, 1877, I collected roots of sea plantain on the banks of the Wyre for larvæ of *Gelechia instabilella*, which mine in the roots, and, as far as present observation goes, not in the leaf or stem. From these emerged a dozen imagoes of *G. instabilella* about the middle of July; and to my surprise, on June 30th, one specimen of a little *Gelechia*, unknown to me, and which Mr. Stainton pronounces to be

probably *G. immaculatella*. Larvæ found mining in the leaves of *Aster tripolium*, and supposed to be the same insect, turned out to be *Gelechia ocellatella*; thus giving another food-plant, and even manner of feeding, to this insect.

At Morecambe, on the cliffs, where *Genista tinctoria* grows, larvæ of *Anarsia genistella* were feeding in the shoots; but this insect appears so like the common form, *A. spartiella*, that I am inclined to refer the difference in size and colour to the more succulent properties of the food-plant, just as *Depressaria costosella* is more deeply marked with reddish under the same conditions. The larva was not compared with that of *A. spartiella*, nor indeed examined with the care due to it. On the same day and at the same place (June 8th) *Plutella annulatella* in the larval state were common in *Cochlearia anglica*: they emerged in the middle of July.

At the latter end of May, whilst collecting larvæ of *Coleophoræ* on the willows, at Farington, my attention was directed to the twisted condition of the shoots of *Lotus corniculatus*, on the railway bank close by. Thinking this was owing to larvæ of some *Sciaphila* I neglected to gather many at the time; but afterwards looking in the tin in which they were placed I perceived a *Gelechia* larva belonging to the *Tæniolella* group, but darker. At the latter end of June one imago of a *Gelechia*, unknown to me, appeared above the rubbish; and on reference to Mr. Stainton he pronounced it to be probably an European species, *G. cincticulella*, which feeds on the Continent on *Genista*. I visited the locality this year, but only obtained one larva, which, unfortunately, died.

Larvæ of *Coleophora Wilkinsonella* began to feed on birch, at Witherslack, about the beginning of July, and continued to do so, at intervals only, until September, when they hibernate full fed, and, if brought into the house early in the spring, they will walk about, as if seeking for food. They, however, will not feed, but change into pupæ, and emerge about the middle of June. This is a similar habit to *C. limosipennella*, which with us never emerges in autumn, but feeds on through the autumn, hibernates, and emerges a little later in the year than *C. Wilkinsonella*. It also feeds on birch.

After very patient and repeated search at length larvæ of *Depressaria capreolella* were discovered feeding on leaves of *Pimpinella saxifraga*,—not on the radical leaves, however,

but on the higher shoot. They are deep green, with black heads; and, through the plant being buried amongst larger herbage, are very difficult to find. A few perfect insects emerged early in August. They feed during the first and second week in July.

In July, 1877 and 1878, I first had the pleasure of finding cones of *Gracilaria populetorum* on birch. At the former date one insect was bred from a miscellaneous collection of buds, mined leaves, &c.; but this year, by observing the different modes of feeding adopted by the larvæ on the birches, I succeeded in taking about three dozen cones, which occupy an entire leaf, and inside which a green, rather transparent larva was feeding. These larvæ changed to very long, taper, light green pupæ, from which emerged, in all, only five imagos of *G. populetorum*, and about eighteen or twenty large ichneumons. This accounts for the comparative rarity of the insect.

Some years ago Mr. Hodgkinson bred a few *Asycha profugellæ* from seeds of gentian; and, as he had afterwards failed in another attempt, I tried other seeds, such as *Pimpinella saxifraga*, wild carrot, &c. On September 29th these were placed in a flower-pot, and exposed all winter; and to my satisfaction, between July 1st and 30th about two dozen imagos appeared, in company with the Tortrix, *Semasia rufillana*, and *Æcophora flavimaculella*.

Preston, August, 1878.

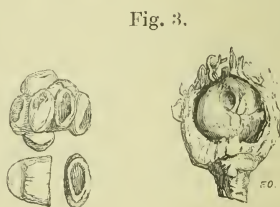
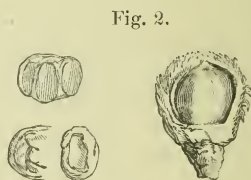
ACORN- AND BUD-GALLS OF QUERCUS CERRIS.

By E. A. ORMEROD, F.M.S.

IN the 'Entomologist' (Entom. x. 42) I drew attention to some specimens of a minute bud-gall found in the previous year on the "Turkey oak" (*Quercus cerris*), and its variety the "Lucombe oak," at Kew: few in number and then deserted, but of some interest to record as soon as secured, as being the first-known instance of Cynipideous gall attack to this species of oak in Britain. Since then, in the spring of 1877, I found a few specimens of the gall with the insect developing; but it was not till May 3rd of the present year that I was able to secure sufficient specimens of the gall, with the contained gall-maker, as to show it to be an *Andricus*, but apparently of a species hitherto undescribed.

The five specimens still in my possession all turn out on examination to be males. These are approximately one-sixteenth of an inch in length; head, body, and abdomen dark brown; tibia and tarsi yellowish brown, with femora of the two hinder pair of legs of a darker colour, and the antennæ of a full brown, darker towards the apex; wings colourless throughout, with slightly tinted brown nervures.

The figure given (Entom. x. 43) represents the gall in the most perfect state as then found, free from the protecting processes which had gradually fallen. Fig. 1 now gives a



magnified view of the gall cluster in its healthiest and most vigorous form amongst the scales, young leaves, stipules, and stipule-like processes in the axils of the successive leaves along the shoot; these clusters usually consisting of about three galls placed separately, but occasionally adnate to each other; ovate-obtuse in shape, but somewhat flattened on one side; the wall of the single-chambered cell flexible and flocculent outside: when examined under a moderately powerful magnifier the galls may be found (as in the figure) placed at intervals along an abortive stalk, each with one or more stipule-like process at its base.

The appearance of this gall has hitherto been entirely limited to one tree of Turkey oak, and a very few specimens (found in 1876) on a Lucombe oak, also at Kew; and it is somewhat singular that acorn-galls, of which figures are given (figs. 2, 3), should occur on these two individual trees, and, as far as has at present been observed, on no others.

The acorn-galls of the two trees differ slightly in the individual cells of the aggregate gall, being rather more numerous and more irregularly placed in that of the Turkey oak than of its sub-variety; but I do not see any essential difference between them. In each instance the gall-mass occupies the whole of the inside of the stunted acorn, and is formed of an aggregation of cells, occasionally separable, but more commonly firmly grown together, this mass being brown outside from the adherence of the outer pellicle of the acorn, and either smooth or irregularly lobed, or with regular lobes running from end to end, according to the more or less regular disposition of the cells. These cells are single chambered, with hard woody walls, and smooth light-coloured interior.

On February 18th I found a few of these gall-deformed acorns, which had fallen from their shells, and had the cells empty and apparently recently perforated, beneath one of the old trees of *Quercus cerris*, at Kew; one specimen, with undeveloped larvæ in the cells, alone remaining in its acorn-shell and cup. The galls in this case were all about a quarter of an inch or more in diameter, formed of from about seven to ten cells; each cell oval in shape, where the pressure of the surrounding mass allowed it characteristic development, but frequently compressed, so as merely to show its rounded extremity. In the most perfect form the cell appeared suddenly flattened towards one extremity, and at the other frequently marked by an oval depression (sketched, magnified, see fig. 2, 3) extending about half across it, surrounding a slightly raised convex spot,—a peculiar marking I have not noticed in other galls. The exterior of the cells, where exposed, is shaggy, and sometimes marked by irregular striæ; and the aggregate mass much resembles in its irregularly lobed form a miniature raspberry.

In the case of the Lucombe oak the galls were rather smaller, so as to be entirely included in the acorn-cup, which is abnormally contracted into a globular form, closed at the top; the gall also is composed of rather fewer cells, and these are occasionally separable, and somewhat more symmetrically arranged, and occasionally with the peculiar depressed mark. In other respects, both of form and colour, shagginess of exposed surface, and crisp woody walls to the single-chambered cells, the galls exactly correspond, and appear to me the work of one gall-maker. The very great number of gall-diseased acorns on this tree was also observable,

as from the beginning of October of last year till the middle of December the ground was well strewn with the fallen crop, and every acorn examined invariably showed gall presence, and commonly contained larvæ,—white, thick, and fleshy,—but which, though apparently perfectly healthy and filling their cells, still (on July 11th) gave no sign of passing into a state of pupation.

The galls correspond in so many points with the description of those of *Andricus glandium*, given by Mayr (translated on the opposite page), that I conjecture them to be similar, and the greater distortion of the acorn in the specimens before me merely to be the result of the whole of the interior of the acorn being occupied by the gall-cells, instead of only a portion (as in his figured specimen); and the larvæ also coincide with those mentioned in the long period elapsing before development.

It is remarkable that the acorn and the bud-galls should both occur, as far as at present seen, on these two trees, and no other, and the departure of the insect from the acorn-gall (in the case of some specimens on the *Quercus cerris*) having taken place apparently just before the time when the eggs for the bud-galls would (conjecturally) be deposited, suggests whether further search may not give an instance of the alternations, now considered proved by various observers.

I should add that since writing the above I am indebted to Herr von Schlechtendal (to whom I had forwarded specimens) for his opinion that the bud-gall corresponds with that of *Andricus circulans* of Mayr.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Continued from p. 183.)

91. *Spathogaster glandiformis*, Giraud.—This gall appears at the beginning of May on the fertile flowers of the Turkey oak. In the early stage it greatly resembles a normal fruit bloom, and it is almost impossible to recognise it. By the middle of May it becomes more or less rosy, and soon begins to get much larger than the ordinary fruit; gradually the galls swell to the size of a pea, or even a hazel nut; the

linear apical leaves lengthen, and mostly grow uniformly from the whole exterior of the nearly globular gall. It seldom remains quite green; the apical leaves generally redden, or the whole gall becomes reddish in colour. The style, with its accompanying depression, is always recognisable, even when it does not appear set on opposite the footstalk. In section it shows that the involucre, as well as the lower part of the germen, is enclosed in a green, soft merenchyma, which contains several larva chambers. The fly appears at the end of May or beginning of June, although I once obtained them as early as May 19th.—G. L. MAYR.



Fig. 91.—Gall of *Spathegaster glandiformis*, and in section.

This inconspicuous and early Turkey oak gall is not likely to occur in Britain. *Synergus Thaumacera*, Dalm., *Ceroptres Cerri*, Mayr, and *Megastigmus dorsalis*, Fabr., were bred sparingly with the gall-maker in May or June of the first year.—E. A. FITCH.

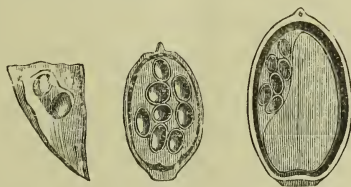


Fig. 92.—Sections of acorn, with galls of *Andricus glandium*.

92. *Andricus glandium*, Giraud.—If we cut through the fallen acorns of the Turkey oak in autumn we often find in their interior a remarkable thickening of the brown shell,

which takes the place of part of the nut, and in section show white, hard, oviform or polyhedral inner galls, of about the size of a hemp-seed. These are joined together with slightly denser tissue, and in each there lies a gall-fly larva. Sometimes we find the acorn-shell only thickened by a single gall at a place, but sometimes the seed is wholly appropriated, and the whole acorn filled with these galls. Herr von Haimhoffen first observed some females from three-year old galls. Of galls collected by me on September 28th, 1869, I have kept some quite dry, and others I have laid in water for a few hours from time to time: those which I collected early last autumn I have kept separate from those in sand, which is kept moist. From none of these galls have I yet obtained an insect, although in the greater part of them the larvæ are still living.—G. L. MAYR.

This acorn-gall has rather puzzled me for some time. It is doubtfully British. On October 26th, 1874, Mr. G. B. Rothera wrote me that he had found an acorn-gall at Ollerton (Nottinghamshire) on September 28th, 1873, as follows:—"My acorn-gall is certainly not that figured by Mayr, nor does it agree with the description given by Giraud, which applies to a multilocular gall. The one I found consisted of a thin, shelly, unilocular gall, lying loosely within the acorn case, and containing a large, fat, white, mandibulate larva, closely resembling that of *Cynips Kollari*. Unfortunately I damaged the larva in cutting open the gall, so that there is no chance of hatching the insect. If the larva had been a mere nomad, feeding upon the seed-lobes (cotyledons), these would have shown the usual division; instead of this, however, we had a perfectly closed chamber, with thin nut-like walls." In the early summer of 1875 Mr. Cameron collected two or three galls in the neighbourhood of Glasgow, which he referred to this species. These were from the common oak; and as the gall-maker has not been bred they cannot be referred with certainty to the *Quercus cerris* species. Mr. Cameron bred a specimen of *Synergus vulgaris* from one gall: this is given by Dr. Mayr as an inquiline in the galls of *A. glandium*. On the other hand, last autumn, guided by Miss Ormerod, I collected a quantity of the small acorns of *Quercus cerris* var. *Lucombeana* from Kew Gardens, almost the whole of which were tenanted by larvæ: I at first thought these might be coleopterous *Balanini*. A description and note on these galls appears in the present issue (Entom. xi. 201): they somewhat differ from Mayr's figure, but like

the others are doubtfully referable to *A. glandium*. Dr. Giraud says the galls form a hard mass *between* the shell and the nut of the acorn. I may here state that in the autumn of 1875 I received, from the late Edward Newman, a curious, but true, gall, actually formed in a common nut (filbert). It was between the nut, with a very marked depression, and the shell near the base. I believe it came from Mr. Bond.—
E. A. FITCH.

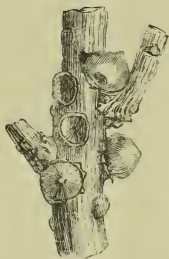


Fig. 93.—Galls of (?) *Cynips ramicola*.

93. *Cynips ramicola*, Schlechtendal.—On plate 7 of this work there is a typical specimen of this species, for which I am indebted to Herr von Schlechtendal. I considered it probable that these bark-galls were immature, and that they were the same as some which, in my collection, are mixed with galls of *Aphilothrix Sieboldi*. They occur on the same bough; and at plate 1, figure 5, are figured in the centre of the upright twig. [See Entom. vii. 52.]—G. L. MAYR.

After noticing the, to him unknown, ? *Cynips superfetationis*, the gall of which was described by Giraud as resembling a small acorn grafted on another, and occurring on *Quercus pubescens* and *Q. pedunculata*, Dr. Mayr, in an appendix, gives a little further information on one or two included species, and describes four others. The first, *C. ramicola*, belongs to the puzzling little group of bark-galls, which includes the single-celled form of *A. radialis*, *A. corticis*, *A. rhizomæ*, and *A. Sieboldi* (= *corticis*); *Radialis* occurs in Britain commonly; *Sieboldi* is widely distributed, and not rare; whilst *Corticis* has lately been added to our fauna (Entom. x. 165). Dr. Adler attempted to show that *A. corticis* and *A. rhizomæ* were one species; but Dr. Mayr tells us that he only refers to two forms of *A. corticis*, and did not know the gall of *A. rhizomæ* at all.—E. A. FITCH.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

NOTE ON THE MEADOW-BROWN (*SATYRUS JANIRA*).—This species having been extremely common here during the whole of July—four or five times more plentiful than the “whites,” taken collectively, at least in the earlier part of the month—I have observed a few points in its habits, which may be worth putting on record. It visits, as far as I have seen, exclusively hedgerow-flowers, such as the blackberry blossom, the wild roses (as long as they remained), the thistles, the privet, and a white umbelliferous flower very abundant along the hedges in this district. I have repeatedly observed one and the same specimen fly from a blackberry flower to a thistle, or *vice versâ*; but I never saw one of them visit red and white clover, even after sitting on the ground close to the plants. I have watched one fly across the corner of a potato field and repeatedly settle upon the leaves, but it never visited one of the flowers. This insect has some protective habits: when sitting upon a flower, or on the ground, with its wings closed, the under side of the anterior pair would be very conspicuous, on account of the eye-spot at the outer angle; it therefore very frequently lowers the anterior wings, so that they disappear between the posterior pair, and in this attitude it may well be taken, by man or bird, for a discoloured leaf; when sitting upon the ground, also, it very generally leans on one side, so that its closed and erected wings, instead of standing at right angles to the ground or other surface, “heel over” at a very acute angle. In this position the insect’s resemblance to a withered leaf is much increased. I have seen other butterflies assume this attitude, but none so generally. As might be expected the meadow-brown is very bold, hovering round, and even settling upon, persons who walk leisurely through its haunts; so it may easily be captured with the finger and thumb when at rest upon a leaf. Like most of its congeners it appears early in the morning, retires comparatively late in the evening, and is less apt to vanish on the approach of heavy clouds than the members of the genus *Vanessa*. It may be counted among the many species which will settle upon dung, recent or decayed, and imbibe its juices.—J. W. SLATER; 3, Bicester Road, Aylesbury.

NOTE ON *ARGYNNIS PAPHIA*.—On August 7th, in an enclosure in the New Forest, *Argynnis Paphia* was in abundance, but good specimens were hard to find, being so

late in the season. Observing two which looked good specimens flying about near one another I netted them, and found one was a female, evidently just emerged, and the other a male, in only fair condition. I killed the female, and let the male go. Noticing, however, that the male continued to fly round my head I held out the female in my hand: the circle of flight of the male became smaller and smaller; and at last the insect alighted on my hand, where it sat for some little time, until I moved off to show it to a friend who was with me. It then flew off, but again alighted; and we watched it on my hand for a minute or two. I then took it by the wings and threw it into the air. It flew overhead for a little time, but then seemed to have lost the attraction, and flew away. I may mention that at the same time and place I took one of the variety *Valezina*, and missed another; my friend also took one the next day.—[Rev.] W. W. FOWLER; Repton, Burton-on-Trent.

ON *HESPERIA ACTÆON*, &c.—This little butterfly has been very scarce this year, as well as all other insects; but last year it was in greater profusion than I have ever seen it. The first I captured was on June 20th, and the last on September 4th. It is more widely distributed than is commonly supposed, as I have taken it in various places on the Dorset coast, from Swanage to Preston Preventive Station, which is not far from Weymouth. At Portland I have taken only a couple of *Acidalia degeneraria*, three of *A. rusticata*, and three of *Eudorea phæoluca*, besides several of *Psylla artemisiæ*. These species are almost, if not entirely, confined to Dorsetshire, as far as the British Isles are concerned, with the exception perhaps of *A. rusticata*.—C. W. DALE; Glanville's Wootton, August 2, 1878.

VARIETY OF *LYCÆNA ALEXIS*.—Whilst collecting in the Isle of Wight I captured, on June 6th, an hermaphrodite specimen of *Lycæna Alexis*; the two wings on the left-hand side being the ordinary male type, whilst the right-hand side has the female markings clearly defined, the red marginal spots being very distinct. The female side of the specimen is smaller, and the wings are rounder than the male side. It was flying in a chalk-pit at Arreton, together with a great many common blues and heaths.—ARTHUR J. ROSE; Mutlah Lodge, College Avenue, Hackney, June 20, 1878.

LARVA OF *NOCTUA RHOMBOIDEA*.—As nearly three years have now elapsed since the autumn when I had the good luck to obtain eggs of this species (in that season one of the

lions of Lyndhurst), and as—though I have patiently waited for its advent—no description has emanated from the pen of those entomologists who usually describe larvæ, although the larva does not resemble the description given of it in Newman's 'British Moths,' I cannot but suppose that they have failed to obtain it, or that they have confounded it with that of *Noctua baja*, which it closely resembles. I therefore venture to offer to the readers of the 'Entomologist' the following notes. In the middle of August, 1874, having captured at sugar some worn females of this species, in Hurst Hill Enclosure, New Forest, I confined them, along with some twigs of bramble, in a bandbox covered with leno-muslin, and they deposited eggs pretty freely, not on the plant, but in clusters on some projecting splinters of wood, and on the leno. The eggs were of the usual *Noctua* form, and pale lemon-yellow in colour, and hatched at the end of the month. The young larvæ at first resembled those of *N. festiva*, but after a moult they assumed a dull opaque tint, somewhat between olive and Prussian green, with the five lines tolerably well defined, paler than the ground colour, the spiracular especially conspicuous and whiter than the rest, its upper boundary defined by a thin dark line; their heads ochreous-brown. They fed at first on mint, but during the winter I supplied them with carrots; and the only three which I retained through hybernation attained a very large size, and buried by the end of the first week in February, 1875. The full-fed larva is one inch and four lines in length, at rest; one inch and nine lines when fully extended, when it appears rather more elongate and less dumpy than that of *N. baja*. It is plump, attenuated in front; the 12th segment tumid dorsally, and the segmental divisions tolerably deeply incised; the head and the usual trapezoidal and other dots each bearing slender whitish hairs. The head is sienna-brown reticulated with black, with two crescentic black marks (one on each side of the median suture) placed back to back, and having between them a pale line forked at its lower extremity. The plate on the 2nd segment is raw-sienna-brown, with the commencement of the dorsal line whitish, broad, and well marked; the subdorsal indistinct, or sometimes absent. The body is smooth and soft, and its colour is a mixture of different tints of brown and dirty ochreous, sometimes even (as in *N. baja*) approaching to a pale rose-madder, at other times of a more uniform dingy sepia or umber-brown, irrorated and reticulated with smoke-

colour. The whole surface has a peculiar streaky appearance caused by the greater boldness of the dusky reticulations, as compared with those in *N. baja*; these on the dorsal surface mass themselves into a series of lozenge-shaped marks, more or less distinct, each defined posteriorly by a slightly-darker V-shaped shade, the apex (except on the 12th segment, where the lozenge becomes a triangle) pointing backwards. On the 11th and 12th segments the V's are replaced by a pair of dark brown triangular marks. The medio-dorsal and subdorsal lines are ochreous and interrupted; the former passes through the centre of the dorsal lozenges and, in the centre of each segment after the 4th, through a pair of short, curved, ochreous marks, edged anteriorly with smoke-colour: these marks are nearly erased in the dark specimens, but conspicuous in the paler ones. The subdorsal lines are somewhat dilated on the posterior edge of the hinder segments, and are united at the hinder edge of the 12th segment by a transverse ochreous band. There is a slender, whitish, spiracular line sharply defined along its upper edge by a broad dark shade, scalloped above the convexities of the scallops upwards, and followed below by a broad band, grayish or reddish ochreous, mixed with dirty whitish. There is behind each spiracle an oval, dark brown blotch, and a distinct black dot just above the spiracular line in the centre of the 3rd and 4th segments. The ventral surface and claspers are grayish ochreous, slightly tinged with the prevailing ground colour; the legs ochreous-brown. Spiracles (in the paler larvæ) ochreous, in a delicate black ring; in the darker larvæ dark brown, in an ochreous ring. Usual spots ochreous, each accompanied by a dark brown dot. I may mention that in the bright-coloured varieties of *N. baja* (I have had them of a deep orange) the subdorsal lines are canary-yellow; in the same varieties of *N. rhomboidea* they are of the usual dull ochreous.—BERNARD LOCKYER; 27, King Street, Covent Garden, London.

ACHERONTIA ATROPOS AND ACRONYCTA ALNI.—I have obtained, since July 30th, about a dozen larvæ of *Acherontia Atropos* found feeding on *Lycium barbarum* (tea tree); also upon privet: two were the dark brown variety. On August 12th my wife found a larva of *Acronycta alni*, at rest, on dog-rose; it has since fed up upon pear leaves, and is now a pupa; it spun up amongst the loose leaves. One I got last season produced a fine female specimen on the 27th of last May.—G. BAKER; Ashby Road, Burton-on-Trent.

ACRONYCTA ALNI.—A friend brought a fine full-fed larva of this moth to me recently. He found it feeding upon a lime tree, in Eserick Park, on July 25th.—T. FOSTER; 6, Wren Lane, Selby, Yorks, August 5, 1878.

ZYGÆNA FILIPENDULÆ.—Out of about a score of chrysalids one emerged in July with the spots and under wings a beautiful pale yellow.—E. D. FISH; Higher Tranmere, Birkenhead.

ON THE DISAPPEARANCE OF ORGYIA CENOSA FROM WICKEN FEN.—Sixteen years ago this species was in the greatest abundance in the larva, pupa, and imago states, at the same time: I found them all over the fen. I have visited the fen several times in different years since, and they have been getting scarcer every time. The fen men have not now seen the larvæ for three or four years; but I have known the time they used to find them by hundreds. The last that I can hear of this species being taken was about three or four years ago, by Mr. Wheeler, at light: there have been none seen since. In 1875 and 1876 the whole fen was covered with water, and it is probable that the hybernating larvæ were drowned: the fen was covered with water for over a month at the time. I have never found this species in any of the Norfolk or Suffolk fens, and am afraid it will soon become, like *Liparis dispar*, a thing of the past in this country.—T. EEDLE; 40, Goldsmith Row, Hackney Road.

EUPECILIA GEYERIANA AND GELECHIA PALUSTRELLA.—During a short stay in the Norfolk fens last month I secured a fine series of *Eupæcilia Geyeriana*: they fly just before dusk, and are very active on the wing. I also took four examples of *Gelechia palustrella*: these came to the light-house, which I carry in the boat, at about one o'clock in the morning.—E. G. MEEK; 56, Brompton Road, August 2, 1878.

CLOTHES-MOTHS: LIFE-HISTORY, AND HOW TO DESTROY THEM.—The name clothes-moths is applied to several distinct, but similar, species of minute moths belonging to the family Tineidæ, which, in their larval state, are very destructive to woollen goods, fur, skins, feathers, and similar substances. Among them may be mentioned the clothes-moth (*Tinea vestianella*), the carpet-moth (*Tinea tapetzella*), the fur-moth (*Tinea pellionella*), and the hair-moth (*Tinea crinella*). These Tineidæ have slender bodies, and lanceolate deeply-fringed wings that expand six-tenths or eight-tenths of an inch. The antennæ and palpi

are short and thread-like, and there is a thick orange or brown tuft on the forehead. The colours range from buff to drab and dark gray. The eggs are laid in May and June (the moth dying immediately afterwards), and hatch out in fifteen days. The young worms at once proceed to work, gnawing the substances within their reach, and covering themselves with the fragments, which they shape into hollow rolls and line with silk. These rolls are by some carried on their backs as they move along, and by others fastened to the substance they are feeding upon, and they are enlarged from time to time by additions to the open extremities, and by portions let into the sides, which are split open for this purpose. In such ambush the worms carry on their work of destruction through the summer, rest in seeming torpor during the winter, and change to chrysalids early in the spring. They transform again in twenty days, and issue from their shelter as winged moths, to fly about in the evening till they have paired, and are ready to lay eggs. Then follows an invasion of dark closets, chests, and drawers, edges of carpets, folds of curtains, and hanging garments; and the foundation of a new colony is swiftly laid. The early days of June should herald vigorous and exterminating warfare against these subtle pests. Closets, wardrobes, all receptacles for clothing, should be emptied and laid open, their contents thoroughly exposed to light and air, and well brushed and shaken before being replaced. In old houses, much infested with moths, all cracks in floors, wainscots, shelves, or furniture, should be brushed over with spirits of turpentine. Camphor or tobacco should be placed among all garments, furs, plumes, &c., when laid aside for the summer. To secure cloth linings of carriages from the attacks of moths sponge them on both sides with a solution of corrosive sublimate of mercury in alcohol, made just strong enough not to leave a white mark on a black feather. Moths may be killed by fumigating the article containing them with tobacco or sulphur, or by putting it, if practicable, into an oven heated to about 150° Fah.—C. V. RILEY. [Extracted.]

[*T. vestianella*, Steph., is a synonym of *Tinea* (*Blabophanes*) *rusticella*, Hb.; and *T. crinella*, Tr., of *Tinea* (*Tineola*) *biselliella*, Hummel.—ED.]

“A HUNTING WASP.—The following interesting account of a chase between a wasp and a spider has been forwarded to ‘Nature,’ July, 1878, by Mr. Henry Cecil, who wrote to ‘Nature’ on the subject (vol. xvii. p. 381):—

"The Piræus, Athens, June 19.

"Dear Sir,—Your letter of April 5th, and the two numbers of 'Nature,' reached this during my absence in Thessaly, which must be my apology for not having sooner replied to your letter. Though more than thirty years have elapsed since the circumstance alluded to, I perfectly remember the curious chase I witnessed of a very large and powerful hunting-spider by a species of wasp. I was sitting one summer's afternoon at an open window (my bed-room) looking into a garden, when I was surprised to observe a large and rare species of spider run across the window-sill in a crouching attitude. It struck me the spider was evidently alarmed, or it would not have so fearlessly approached me. It hastened to conceal itself under the projecting edge of the window-sill inside the room, and had hardly done so when a very fine large hunting-wasp buzzed in at the open window and flew about the room, evidently in search of something. Finding nothing the wasp returned to the open window and settled on the window-sill, running backwards and forwards as a dog does when looking or searching for a lost scent. It soon alighted on the track of the poor spider, and in a moment it discovered its hiding-place, darted down on it, and no doubt inflicted a wound with its sting. The spider rushed off again, and this time took refuge under the bed, trying to conceal itself under the framework or planks which supported the mattress. The same scene occurred here; the wasp never appeared to follow the spider by sight, but ran backwards and forward in large circles like a hound. The moment the trail of the spider was found the wasp followed all the turns it had made, till it came on it again. The poor spider was chased from hiding-place to hiding-place—out of the bed-room, across a passage, and into the middle of another large room, where it finally succumbed to the repeated stings inflicted by the wasp. Rolling itself up into a ball the wasp then took possession of its prey, and, after ascertaining it could make no resistance, tucked it up under its very long hind legs, just as a hawk or an eagle carries off its quarry, and was flying off to its nest, when I interposed, and secured both for my collection. Both insects were rare ones; and during the ten years I collected as a field naturalist in Greece I don't remember ever seeing more than three or four specimens of either that species of wasp or spider. The wasp was a hunting one (a female), about an inch and a half long; a very finely formed insect, which for gracefulness of form

and beauty of colouring is entitled to be placed at the head of its species.* The legs of this kind of wasp are very long, and of a dark chocolate-brown; it runs very quickly. The wings are a light brown with dark brown tips, and long and powerful; and the body beautifully mottled with pale yellow and brown. It has very long, fine antennæ. It is not an English species; but probably exists in Spain, the south of France, and Italy. The spider, too, was a rare one: one of the largest Greek hunting-spiders, nearly as large in the spread of its legs as the flesh-coloured tarantula, though without his powerful crab-like pincers. The one I allude to must have covered at least three inches in circumference when its legs were fully extended. It was of a dull mottled brown colour on the upper surface of the body; very difficult to distinguish from the ground. The lower part of its body was, however, brilliantly coloured, the long legs, or arms, being marked underneath with velvet-like-looking black and white rings. The head, thorax, and abdomen, were of a velvety black, the lower portion of the latter surrounded with a bright orange ring. There is only one error in the account given by you in 'Nature,' that is that you were under the impression I told you that kind of spider was the common prey of that species of wasp. You must have misunderstood me. (1.) I do not think that particular kind of spider is sufficiently common for this to be the case. (2.) I never saw a similar conflict of the kind before or after, which, as it was in a room, and not in the grass, where I presume such encounters usually take place, I observed under exceptionally favourable circumstances. I am certain the spider left no web or thread behind it. I cannot be sure, however, that, as it had evidently been attacked by the wasp before entering my room, a small quantity of liquid may not have exuded from its wounds, which may have helped the wasp in tracking it. I have no doubt myself that insects have the sense of smell, and probably much more developed than our own. No one, as you remark, who has sugared for moths, or seen the large *Sphingidæ* hovering over the strongest-scented flower at night, or employed a caged female moth as a lure to her male admirers, can, I think, doubt this. If so, let them put a saucerful of honey in a corner of a room opening into a garden, throw open the window, and see how soon the bees, wasps, &c., will be attracted to the honey. There is a

* The hunting-wasp was, no doubt, a species of the genus *Pompilus*.—
F. SMITH.

tradition in the East that one of the tests by which the queen of Sheba tried to prove the wisdom of Solomon, was placing on a table before him two bouquets, one of artificial, and the other of natural, flowers, and requiring that he should say which were the real and which the artificial, without moving from his throne. Solomon ordered the windows to be thrown open, and in flew the bees, &c., which went at once to the real flowers. Whether the senses of insects, birds, and what we call the lower creation, are similar to ours in every respect, it is very difficult to say. No doubt a dog, if he could speak, would say a man had not the sense of smell, and would prove that his nose was worse than useless to him. An eagle or hawk would say that men and moles, &c., have only the rudiments of eyes; and so on. Man, with five very imperfectly developed senses (who can say that there are not twenty senses), is the only animal that is dogmatical, and denies all he cannot understand. The oracle of Delphi said 'Socrates was the wisest man in Greece, because he was the only man who knew he knew nothing.'—Yours faithfully, C. L. W. MERLIN.

"To Henry Cecil, Esq., Bournemouth."

PRESERVATION OF EPPING FOREST.—The Epping Forest bill received the royal assent on the 8th August last; and from that day, after a twenty-five years' struggle, a tract of close upon six thousand acres of virgin forest will be preserved for public use. By its provisions what remains of the Forest will be vested in the Corporation of London, for ever, for the use of the commoners and the recreation of the public: thus one of the "happy hunting-grounds" of the metropolitan entomologist is still likely to retain many of its treasures. Its rich insect fauna is constantly referred to throughout our own ten volumes. London naturalists certainly must be congratulated on their city standing alone amongst the European capitals as possessing a virgin forest actually touching its borders (at Stratford). The whole county of Essex was originally one vast forest. Kings Stephen and John were the first to commence its disafforestation, which has gradually been going on to the present day. It is to be hoped that this is now effectually stopped; and that Loughton or Waltham will long continue a favourite resort, not only for the mere holiday-maker and lover of Nature, but for the scientific naturalist.—E. A. F.

THE ENTOMOLOGIST.

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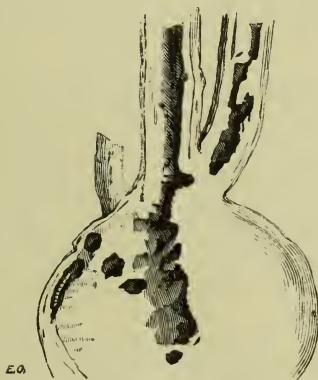
OCTOBER, 1878.

[No. 185.]

NOTES ON PSYLLIODES CHRYSOCEPHALA.

By E. A. ORMEROD, F.M.S.

Fig. 1.



PSYLLIODES CHRYSOCEPHALA.

ABOUT March 18th of the present year, whilst examining a bed of white turnips running up into flowering stems in my garden, near Isleworth, I noticed that many of the shoots were channelled internally by small grubs. In some cases these galleries appeared only just begun, and were still only horizontal piercings at distances along the stem, with the larvæ occupying more than half the length of the tunnel, but more frequently, judging by the discoloration and the progress of the injury, the work had been commenced some time before at the ground level, and had been carried thence some inches up the stem, occasionally diverging into the petiole of the leaf; and later on (as shown at fig. 1) the larval workings were to be found both in the centre and beneath the rind of the bulb itself.

The bed of turnips, as well as some others in the neigh-

bourhood, proved greatly infested. Of thirteen plants brought in for examination only one proved free from attack, but the larvæ were not numerous in each plant; sometimes as many as three or four were to be found at distances along the galleries; sometimes only a single specimen was discoverable.

The injury being new to me I isolated some of the attacked plants with the larvæ, which developed about the beginning of June into the well-known beetle *Psylliodes chrysocephala*, distinguishable from its near allies the turnip-flea beetles (*Phyllotretæ*), technically, by peculiarities of the antennæ and posterior tarsi, and to general observation by the rather larger size, more robust form, and even greater saltatory powers. As I am not aware that its life-history has been given in England, a short note may perhaps be of interest.

The larvæ varied in size when first seen from just over one-sixteenth of an inch in length to five-sixteenths, apparently the limit of growth, and were white or yellowish in colour, with dark brown mottled head and strongly-toothed jaws. The segments of the body slightly hairy, with transverse rows of minute pale tubercular spots, for the most part armed with a dark brown bristle, and having smaller and paler rows placed between them for a short distance from the caudal segment. The segment immediately behind the head is marked on the upper surface by two triangular patches formed of brown dots placed along the central white line, and by a curved line of dots running longitudinally along each side of the segment; between these and the central markings is an irregular pattern of dots, usually involving in it a V-shape, with the point turned to the central line, as given

Fig. 2.



at A, fig. 2. The upper surface of the caudal extremity is convex, pale brown, glistening, and horn-like, armed at the tip with two minute upturned triangular points, and marked by two pairs of rows of brown spots placed longitudinally, and usually with the inner line of each pair straight, the outer diverging, so as to follow the outline of the segment, fig. 2, B. The caudal foot was extremely strongly developed.

On May 21st the larvæ were passing into the pupal state in earth near the turnips, and, in all the specimens observed, lay either immediately beneath the surface or about half an inch beneath, but not in formed cells,—simply in earth, necessarily smoothed by the presence of the pupæ, which were placed indifferently in horizontal or vertical direction.

On May 28th the turnip stems appeared deserted by the larvæ, though a few might still be found unchanged in the earth with the pupæ. The pupæ were of a yellowish colour, about an eighth of an inch in length, and sprinkled with stout hairs, both in transverse lines on the segments and also on the back of the thorax. The shape narrowly oval, tapering gradually to the caudal extremity, and terminated in a somewhat lunate form by two appendages, consisting (as seen magnified) of a bulb narrowed suddenly into a prolonged cylindrical process curved inwards, and slightly tapering to its blunt extremity, the bristles with which the whole appendage is covered being arranged in longitudinal striæ along the bulb, and in successive sheathing rings gradually narrowing towards the extremity on the cylindrical prolongation, much resembling in miniature the sheathing of the flowering stems of some of the *Equisetæ*. Fig. 2, c, gives the appearance of the bulb magnified, and at its side a still more enlarged sketch of the sheaths of the cylindrical prolongation.

On June 3rd the pupæ nearest the surface of the soil had begun to change colour previous to complete development; and on the 21st the perfect beetles were to be found on the surface, the collections of isolated specimens which had been placed in the driest situations, showing the greatest number of beetles. All, with one exception, turned out typical specimens of *Psylliodes chrysocephala*, too well known to require description; the solitary exception, however, proving of some interest as a specimen of the *Psylliodes nigricollis*, considered sometimes rather a variety of the *P. chrysocephala* than a distinct species. The mere finding of this beetle with the others, without having especially observed the individual larva it proceeded from, of course leaves this question still open; but the plants infested with the larvæ having been selected and isolated with great care it points to a similarity in food, locality, and life-history.

Looked at economically the *Psylliodes* presence seems of little moment, except in the decay induced in the turnip

bulb, where several larvæ are present; but the vigour of the developed beetle, and great vital powers of the larvæ under injury, might make it an inconvenient guest; and its habits in its early stages lay it so thoroughly open to attack by burning infested bulbs, or throwing the ground open to be cleared by the birds, that its destruction where much present would be a task of little difficulty, and certainly desirable.

Isleworth, September 10, 1878.

DESCRIPTIONS OF OAK-GALLS.

Translated from Dr. G. L. MAYR's 'Die Mitteleuropäischen Eichengallen.'

By EDWARD A. FITCH.

(Concluded from p. 207.)

a. b. c.



Fig. 94.—Galls of *Aphilothrix albopunctata* a. Collected by myself; b. Schlechtendal's type; c. Schenck's type.

94. *Aphilothrix albopunctata*, Schlechtendal.—This gall is developed in April from the buds of the last year's twigs of *Quercus pubescens*, *Q. pedunculata*, and *Q. sessiliflora*. It is elongately oviform,—5 to 6·6 millimetres in length, and 3 to 4 millimetres in breadth,—smooth, green (later often yellowish brown), more or less covered with elliptical whitish spots placed lengthwise. It has at the apex a small (sometimes indistinct), brown, well-marked papilla, and is surrounded at the base with the bud-scales. In section the gall exhibits an outer, at first somewhat soft but quickly hardening, rind, which surrounds the moderately thick-walled, woody, inner gall, and is attached to it. The gall falls from the bud in the first fortnight of May; and according to Schlechtendal the gall-fly emerges at the end of November. As early as 1865 this gall was described by Professor Schenck, in his 'Beitr. z. Kenntniss d. nass. Cynip.' (p. 116); but he only bred *Synergi* from the galls

found by him. I found it myself in 1869 on April 15th; in the following year at the beginning of May; and also this year (1871) on *Q. pubescens* and *Q. sessiliflora*, but have not yet bred the gall-fly.—G. L. MAYR.

I first found the galls of this species in Essex, on July 3rd, 1874, but believe it to be widely distributed in Britain, as it occurs in Mr. P. Cameron's list of Sutherlandshire Hymenoptera. I have collected numerous specimens of these galls in the early summer of every year since, but, like Mayr, have not yet bred the gall-maker. Schlechtendal only bred a single specimen. The insects I have bred have been *Synergus facialis*, Hart., very abundantly in June and July; *S. radiatus*, Mayr, with *S. facialis*, but much more uncommon; *Eurytoma squamea*, Wlk., commonly; another species of *Eurytoma*; *Megastigmus dorsalis*, Fabr., rarely; two, if not three, species of *Pteromalus*; *Eupelmus urozonus*, Dlm., rarely in July; and two other species (one, commonly) of *Chalcididæ*, which are unknown to me. Dr. Mayr says Herr Wachtl bred two specimens of *Olynx trilineata*, Mayr, from these galls, in February of the second year.—E. A. FITCH.

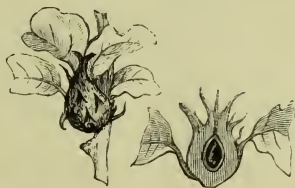


Fig. 95.—Galls of *Andricus singularis*, and in section.

95. *Andricus singularis*, Mayr.—In the early part of June, this year, I found this gall, for the first time, in the neighbourhood of Vienna. It is developed from an axillar, rarely from a terminal, bud of *Quercus cerris*, and consists of a green, more or less globular, swelling, which is thinly clothed with hairs, and is generally of about the size of a pea: from this two to four, but not more, very small rudimentary leaves are developed. If we cut through the gall in a perpendicular direction we see that it consists of a thick-walled cup, the small cavity of which contains a single brown, moderately hard, inner gall, of which the apex only is free above, whilst everywhere else it is enveloped in the green fleshy cup. In rare cases the small twigs continue to grow

from the margin of the cup, and bear leaves. From the collected galls the gall-flies appeared in the middle of June, and I found a gall as early as June 8th, which was already empty: it is, therefore, very possible that the usual flight time is still earlier, for the wet spring of this year retarded the appearance of gall-flies generally. *A. singularis* bites its exit-hole through the upper apical end of the inner gall, so that it is observable without separating the rudimentary leaves. Soon after the emergence of the gall-fly these leaves wither and become yellow, the globular gall shrivels considerably and falls; at least it has done so in many cases, according to my own observations. I at first took this gall for a very small variety of that of *Andricus cydoniæ*, to which it bears a great resemblance, yet it is separable from that species in that it is always much smaller, and because it always contains but a single central inner gall. A comparison of the imagos of the two species leaves no doubt but that they are quite distinct. As may be seen in the figure of the new species the leaf rosette is more or less unconnected with the gall, still it must be placed amongst the bud-galls, for in this case the axis of the bud itself becomes centred in the inner gall. In anatomical structure this gall stands in nearest relationship to that of *Andricus inflator*, differing from it that the inner gall takes up the whole of the small cavity of the short cup, while in the gall of *A. inflator* the inner gall only lies at the end of the large canal-like cavity of the long cup.—G. L. MAYR.

This recently discovered Turkey oak species is hardly likely to occur in Britain. In addition to the gall-maker Dr. Mayr bred *Synergus thaumacera*, *Megastigmus dorsalis*, and *Syntomaspis cerri*, from these galls. This last new species of *Torymidæ* has only been bred from this and the *S. politus* gall; fourteen specimens were bred in March of the second year.—E. A. FITCH.

96. *Spathegaster Taschenbergi*, Schl.—The typical galls now before me agree both in form, size and structure with the gall of *Spathegaster flosculi*, Gir. (*Giraudi*, Tschek.), differing only in pubescence. In Schlechtendal's species the surface of the gall (in the dried state) is thickly covered with dark violet hairs, which stand out perpendicularly: they are straight, rather short, stiff and rather pointed at the ends; whilst in the gall of *S. flosculi* these (in the dried state) are yellowish green, reddish, or brownish yellow in colour, more or less curved, tolerably long, soft and shaggy; the galls are

also sometimes rather narrower in form, the stripes or bands appearing thinner (on account of the loss of sap in drying). In a letter to me Herr von Schlechtendal has corrected his former statement that the galls also appear on the young one-year old twigs. Since the galls of *S. Taschenbergi* and



Fig. 96.—Galls of *Spathegaster Taschenbergi*; and magnified.

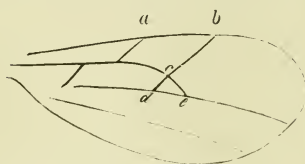
S. flosculi stand so very near one another, and the imagos of both species only differ in unimportant points, I can come to no other conclusion, from our present knowledge, than that they are both one species.—G. L. MAYR.

In May of last year Miss E. A. Ormerod and Mr. G. B. Rothera both sent me galls, which are doubtfully referable to this species. They were collected respectively from Sedbury Park (Gloucestershire) and from the neighbourhood of Nottingham. I have lately also received specimens of the gall from Mr. P. Cameron. As with several bud-galls, so here: it is likely there are two or three closely-allied species, which are not as yet distinctly defined.—E. A. FITCH.

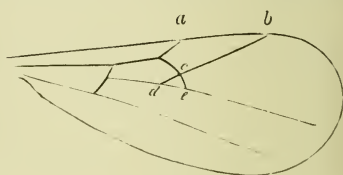
These translations are at last completed. Commenced by Mrs. Hubert Herkomer (*née* Weise), with notes by the late Francis Walker and Edward Newman, and finished by myself, they have run through five volumes of the 'Entomologist.' This length has no doubt made them wearisome to many, but by some I am assured they have been appreciated; and no better starting-point can be taken, for a knowledge of the various galls, than Dr. Mayr's excellent figures and descriptions. The translation has been kept as literal as possible, and in my added notes I have endeavoured to collate what is already put on record respecting the various species. A knowledge of galls has been aimed at by many, but the difficulty of finding a foundation on which to build has deterred many workers. This is shown by the many enquiries that have reached me for books on the subject: of these there are none; gall literature is mostly scattered in various entomological serials. After the works of Malpighi,

DeGeer, Réaumur, Linné, Fabricius, &c., the most important memoirs are Hartig's, in Germar's 'Zeitschrift,' ii. 176—209 (1840), iii. 321—358 (1841), iv. 395—422 (1843); Giraud's, in 'Verhandlungen, z.-b. Gêsellchaft, Wien.' ix. 337—374 (1859); Schenck's, in 'Beitr. z. Kenntniss. d. nass Cyn.' (1865); and Schlechtendal's, in the 'Stettiner Entomologische Zeitung,' xxxi. 338—347, 376—398 (1870); but very many smaller and scattered papers must be referred to. Those by Osten-Sacken, Walsh, and Bassett, in the first four volumes of the Proceedings of the Entomological Society of Philadelphia, are important. A series of papers on the British species, by the Rev. T. A. Marshall, appeared in Ent. Mo. Mag. (1867—8): in these fourteen oak species are described as British; we now know forty-one to be indigenous. This shows that good work has been done.

A general enquiry has been—how to distinguish the inquiline *Synergi* from the true gall-makers? This may be at first rather confusing; but perhaps the best general guide that can be given is the venation of the fore wings. The two



S. FACIALIS.



A. CURVATOR.

a, b, c. Areola radialis; *c, d, e.* Areola cubitalis secunda.

accompanying figures show the difference clearly. The gall-makers have the second cubital areola (*c, d, e*, in figure) at the base of the radial cell (*a, c, b*, in figure), whilst the *Synergi* have it near the middle. The first section—Hartig's "area radialis angusta, areola basalis"—is represented by a wing of *Andricus curator*, Hart., and the inquiline—Hartig's "area radialis brevis, lata; areola intermedia"—by a wing of *Synergus facialis*, Hart.

It is amongst the Hymenoptera, especially the gall-making species, that some of the most interesting and astonishing problems in insect biology are to be worked out. In gall-makers we have the formation of the gall: the active agent, its development, the life-history of the gall-fly, and the other insect life,—normal, inquiline, or parasitic,—which is also connected with the gall. Of each

of these we know comparatively nothing. When the whole life and surroundings of a single gall-fly can be written, it will doubtless be found to bear directly on many disputed or little understood points of entomological knowledge generally. But nothing can be done without breeding; and when the gall species is correctly determined the gall-maker is easily recognised. For some remarks on the breeding of gall-flies, see the 'Entomologist,' viii. 170. The study of the flies themselves is at present difficult and unsatisfactory; the descriptions may be referred to in the papers mentioned above; and there is a synopsis of genera, by Dr. Förster, in the nineteenth volume of the Vienna 'Verhandlungen' (1869).

Two new European oak species have been described since the appearance of Dr. Mayr's work, viz.:—*Andricus Schröckingeri*, Wachtl. (Verh. z.-b. Gesell. Wien. xxvi. 713), which causes a gall on the leaf of *Quercus cerris* something like that of *S. albipes*; and *Aphilothrix Kirchsbergi*, Wachtl. (Verh. z.-b. Gesell. Wien. xxvi. 713). This last is the *Cynips gemmea*, Gir., which was figured in the 'Entomologist,' ix. 78.

The following is a list of our British oak species as far as our present knowledge goes, giving the name of species in the first column, reference to the gall in the second, the time of appearance of the gall in the third, the time of appearance of the gall-fly in the fourth, and the reference to the description and figure in the last:—

				Vol.	Page.
<i>Biorhiza aptera</i> , <i>Fab.</i> . . .	Root	Spring	November	vii.	3.
„ <i>renum</i> , <i>Hart.</i> . . .	Leaf	Autumn	June	ix.	115.
<i>Neuroterus numismatis</i> , <i>Ol.</i> . .	Leaf	Autumn	March	x.	67.
„ <i>lenticularis</i> , <i>Ol.</i> . . .	Leaf	Autumn	March	x.	86.
„ <i>fumipennis</i> , <i>Hart.</i> . . .	Leaf	Autumn	March	x.	121.
„ <i>læviusculus</i> , <i>Schenck.</i> . .	Leaf	Autumn	March	x.	122.
„ <i>ostreus</i> , <i>Hart.</i> . . .	Leaf	Summer	October	x.	161.
<i>Spathegaster baccarum</i> , <i>L.</i> . .	Leaf	Spring	June	x.	206.
„ <i>tricolor</i> , <i>Hart.</i> . . .	Leaf	Summer	July	x.	234.
„ <i>albipes</i> , <i>Schenck.</i> . . .	Leaf	Spring	May	x.	235.
„ <i>vesicatrix</i> , <i>Schl.</i> . . .	Leaf	Spring	June	x.	250.
„ <i>flosculi</i> , <i>Gir.</i> . . .	Bud	Spring	May	{	ix. 75. xi. 222.
„ = <i>Giraudi</i> , <i>Tschek.</i> . .					
„ <i>Taschenbergi</i> , <i>Schl.</i> . .					
„ <i>aprilinus</i> , <i>Gir.</i> . . .					
<i>Trigonaspis megaptera</i> , <i>Pz.</i> . .	Bud	Spring	April	ix.	76.
<i>Andricus noduli</i> , <i>Hart.</i> . . .	Bud	Spring	June	vii.	193.
[„ <i>testaceipes</i> , <i>Hart.</i> . . .	Twig	Summer	September	vii.	99.
„ <i>curvator</i> , <i>Hart.</i> . . .	Leaf	(= <i>A. noduli</i>)		ix.	219.]
„ <i>inflator</i> , <i>Hart.</i> . . .	Leaf	Spring	June	ix.	195.
„ <i>quadrilineatus</i> , <i>Hart.</i> . . .	Bud	Spring	June	ix.	50.
„ <i>amenti</i> , <i>Gir.</i> . . .	Catkin	Spring	? February	xi.	133.
„ <i>amenti</i> , <i>Gir.</i> . . .	Catkin	Spring	May	xi.	114.

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Andricus æstivalis,*	<i>Gir.?</i>	. Catkin	Spring	July	xi. 31.
„	circulans,*	<i>Mayr.</i>	. Bud	Spring	April ix. 51.
„	glandium,*	<i>Gir.</i>	. Acorn	Autumn	xi. 205.
„	ranuli,	<i>L.</i>	. Catkin	Spring	June xi. 87.
„	terminalis,	<i>Fab.</i>	. Bud	Spring	June ix. 28.
Cynips Kollari,	<i>Hart.</i>	. Bud	Summer	August	vii. 241.
Dryophanta	scutellaris,	<i>Ol.</i>	. Leaf	Summer	November ix. 121.
„	longiventris,	<i>Hart.</i>	. Leaf	Summer	October ix. 146.
„	divisa,	<i>Hart.</i>	. Leaf	Summer	October ix. 147.
„	agama,	<i>Hart.</i>	. Leaf	Summer	October ix. 150.
„	disticha,	<i>Hart.</i>	. Leaf	Summer	October ix. 171.
Aphilothrix	corticis,	<i>L.</i>	. Bark	Spring	April vii. 50.
„	corticalis,	<i>Hart.</i>	} Bark	Spring	April vii. 52.
„	= Sieboldi,	<i>Hart.</i>			
„	radicis,	<i>Fab.</i>	. Root	Spring	April vii. 2.
„	gemmæ,	<i>L.</i>	. Bud	Summer	? April viii. 146.
„	glandulæ,	<i>Hart.</i>	. Bud	Autumn	ix. 1.
„	globuli,	<i>Hart.</i>	. Bud	Autumn	February viii. 254.
„	autumnalis,	<i>Hart.</i>	. Bud	Autumn	viii. 255.
„	collaris,	<i>Hart.</i>	. Bud	Summer	viii. 289.
„	albopunctata,	<i>Schl.</i>	. Bud	Spring	November xi. 220.
„	callidoma,	<i>Hart.</i>	. Bud	Summer	viii. 290.
„	solitaria,	<i>Fonsc.</i>	. Bud	Summer	September viii. 169.

Maldon, Essex, September, 1878.

AN INCIDENT IN THE HISTORY OF AMPULEX COMPRESSUM.

By H. S. SCHURR

(Of the Bengal Police, Midnapore).

Received by Mr. G. R. James Rothney, Calcutta.

I HAVE to tell of a real “pucka” bug incident that I saw yesterday, and which may interest you, as a similar incident once before interested you and me in the Fulta Road.

Well, yesterday being a holiday, and I having nothing to do and feeling a bit lonely, I went out for a long exploration on my little pony. I was out ever so long, and came back pretty tired and hungry, and found three men in my rooms smoking, and making themselves quite at home, with kegs, &c. Well, this riled me, as they would not go away; and I couldn't ask them to breakfast as I have only two knives, forks, &c. Well, they eventually departed; and then I had got a headache from my ride, and not getting my tub and breakfast at once. So I laid down and tried to sleep, but it was no use: this man came to call, that man to arrange about rackets, and Chuprassie brought letters and papers to sign, another brought

* Turkey oak species.

recruits for inspection; and I had'nt a moment to myself, and I was properly savage. Looking about my room to vent my rage upon something, I saw a brown something disappear round a corner, and thinking it was a snake I got up to do for him, with a hearty good will. I was surprised to find it was a common cockroach, in tow of one of those green wasps that we saw throwing those ferocious red and black ants off a tree in the Fulta Road. Well, as the cockroach was ever so much bigger and heavier than the wasp, I was a bit surprised to see how easily Mr. Wasp seemed to be hauling him along, and I was curious to find out how and why he did it; so I watched him carefully. He had dragged the cockroach all across my room, over the threshold, and out into the verandah, when he let go of his victim; and, going to a small hole, carefully measured the size every way, then went inside for inspection, and eventually returned to the cockroach, who, strange to say, quietly awaited the return of Mr. Wasp, who uow began his preparations for taking the cockroach in tow; and this is how he managed it. He got hold of the cockroach's feelers,—you know the things I mean, like two long hairs sticking out of his nose, or wherever he may be pleased to carry them; then the wasp with his mandibles got hold of one of the feelers, and began to pull the cockroach; but a bit of the feeler broke off; and the cockroach, instead of trying to bolt, stopped still and twitched all over, as much as to say this is more familiar than pleasant. Well, Mr. Wasp got a good grip of the cockroach, and began to pull him into the hole head foremost: the cockroach allowed him to get his head in, and then, evidently finding the quarters unhealthy and a bit cramped, began to back out vigorously. But it was no go; the wasp had him tight, and began pulling with a will. But presently Mr. Wasp found his victim was stuck fast, and he was unable to draw him in; so he immediately set to work to drive out his victim, the victim aiding him in his endeavours with the most hearty co-operation; and very shortly the cockroach was free, and at large. Having backed about two inches from the hole he very foolishly stopped stock still, and gazed at Mr. Wasp busily engaged in enlarging the hole. Having finished the hole, and finding it to his satisfaction, he quietly got hold of the cockroach by his feelers, and again began to drag him in: it was “a long pull and a strong pull,” but not quite together; as the cockroach said to himself “This is my last chance, and Providence won't come to help me again.” Alas! for him, he was quite

right. So he set to work to resist vigorously, and took advantage of every angle in the entrance and every irregularity he could lay hold of. But at last, after nearly five minutes long and steady pulling on the part of Mr. Wasp, he managed to draw him past the sticking point; and then it was all over with the cockroach.

[*Ampulex compressum* is a brilliant green insect, with bright red legs, and is one of the *Sphegidæ*. It is well known to provision its nest with cockroaches. It is found in India, China, Borneo, Singapore, Sumatra, Java, Celebes, Madagascar, &c.—ED.]

ENTOMOLOGICAL NOTES, CAPTURES, &c.

VANESSA ANTIOPA IN PERTHSHIRE.—I had the good fortune to capture a specimen of *Vanessa Antiopa* on the west side of Ben Lawers, Perthshire, on August 26th.—A. CRAIG-CHRISTIE; Millnore, Killin, Perthshire, August 29, 1878.

EARLY VANESSIDÆ.—Are not the *Vanessidæ* appearing very early this year? On August 9th I took *Cynthia cardui*, *Vanessa Io*, *V. urticæ*, and *V. C-album*, in North Yorkshire, near Pickering; *Argynnis Paphia* were also plentiful, but much worn. Moths were next to entirely absent: I sugared four times, and only saw six *Noctuæ* in all. *Geometridæ* were very scarce, and only the commonest species were represented.—J. C. WASSERMANN; Cullercoats, September 4, 1878.

ABSENCE OF COLIAS EDUSA IN 1878.—After the extraordinary abundance of *Colias Edusa* last year we might naturally expect at least an average occurrence of this species this year; but in this neighbourhood I have not seen a single specimen. I feel interested to know if this scarcity is universal in England, or only confined to this district. Perhaps some of your correspondents will favour us with their experience in other parts of the country in reference to the occurrence of *Colias Edusa* this year.—W. McRAE; Westbourne House, Bournemouth.

VARIETY OF SUPPOSED SATYRUS TITHONUS.—I am sending to you a sketch of *S. Tithonus*. The specimen appears to me to be a remarkable one in the following particulars: *i.e.*, the ground colour of the upper side of both the fore wings is a pale yellowish brown or buff, relieved by the ordinary orange colouring, which contrasts singularly with the ground colour-

ing; the antennæ and the body of the insect are also buff-coloured; and the specimen, which is in good condition, presents generally a bleached appearance, and more resembles *Chortobius Pamphilus* in general colouring, though not otherwise. The specimen, which is a male, and is rather under the usual size I think, was taken by myself near Tenby, South Wales, in the summer of 1871. In the 'Entomologist' for January, 1878, is figured a bleached variety of *Satyrus Janira*, captured near Dover. I have myself seen bleached specimens of that species, but not of *Tithonus*, and cannot find that it is liable to such variation, or indeed to any variation, except with regard to the size or number of the ocelli.—G. W. OLDFIELD; Weybank House, Guildford, September 4, 1878.

[The sketch sent is of what appears to be a very exceptional variety of *Satyrus Tithonus*, and the foregoing is an accurate description.—ED.]

CHÆROCAMPA ELPENOR.—On September 13th I captured a fine specimen of *Chærocampa elpenor* in a spider's web. Newman states June as the month of its appearance. Does it often occur so late?—H. M. PARISH; Mount Street, Taunton, September 18, 1878.

CHÆROCAMPA CELERIO AT WOODBRIDGE.—My collection has lately been enriched by a specimen of *Chærocampa celerio*, captured at Woodbridge, Suffolk, by E. Cobbold, at about the beginning of September. The moth was found settled on a door, at about 7 p.m., and was knocked down with a handkerchief, which was the cause of its wings and body being slightly rubbed; otherwise the moth is in good condition.—H. GRAVES; 15, Lindore Road, Clapham Common.

ORGYIA CÆNOSA AT WICKEN FEN.—Mr. Eedle will be interested to know (Entom. xi. 212) that I took five fine specimens of this species at light, in Wicken Fen, at the end of July last: three of them on the night of the 26th; and two, two or three nights later. Mr. Eedle is very likely correct in supposing that the floods several years ago destroyed most of the larvæ; and should a similar occurrence take place now, perhaps the moth would be all but exterminated. On the other hand, however, it is only reasonable to suppose that a few ordinary seasons may bring the species to us again almost as plentifully as ever; especially as only the males seem to come to light, and the females, which we must suppose are almost as numerous, are rarely seen. I

have more fear of the extermination of *Papilio Machaon* at Wicken Fen than of *Orgyia cænosa*; for although we found the larvæ pretty freely, the systematic way in which they are collected must tell upon them before many years hence.—G. T. PORRITT; Highroyd House, Huddersfield, September 3, 1878.

ACRONYCTA ALNI AT HEREFORD.—I found here, on September 7th, a full-grown larva of *Acronycta alni*, on a stile under a black poplar. Unfortunately it escaped from the box in which it was confined, and was killed by a prowling spider. Is not this unusually late for the larva?—H. N. RIDLEY; Bishopstone Rectory, Hereford, September 10, 1878.

RAPHITES QUINQUESPINOSUS AND ACRONYCTA ALNI.—On August 4th I was fortunate enough to meet with a specimen of the *Raphites quinquespinosus* asleep, in a flower of the black knapweed; and on the 21st ult. I found a full-fed larva of *Acronycta alni* on some palings.—E. N. BLOOMFIELD; Guestling Rectory, September 18, 1878.

LEUCANIA ALBIPUNCTA AT CHICHESTER.—I had the good fortune to take a fine specimen of this insect on August 20th, at sugar, on a willow (*Salix alba*) in front of this house. The instant the light was thrown on the tree it fell to the ground, and was lost; but on my second visit it had returned to the sugar, and I then happily secured it. It seems to me, if I may venture an opinion, that to the characteristics given by Guenée, and quoted by Newman in his 'History of British Moths,' for distinguishing this species from *Leucania lithargyria*, might be added the greater brilliancy and whiteness of the spot, which more resembles that of *L. conigera*. The outer elbowed line, too, which in *L. lithargyria* is broken up into black dots is in *L. albipuncta* distinctly scalloped, or extended into seven very acute angles. I am indebted to the kindness of Mr. Buckler for comparisons with a continental specimen in his cabinet.—J. ANDERSON, jun.

LEUCANIA ALBIPUNCTA IN THE ISLE OF WIGHT.—While collecting in the Isle of Wight during this season I had the good fortune to take eight specimens of *Leucania albipuncta*.—J. VENABLES; Barnes.

LEUCANIA ALBIPUNCTA.—While staying at Folkestone last August I took two specimens of *Leucania albipuncta* at sugar: the first, a female, on the 14th; and the second, a male, on the 25th. Both came to sugar rather late in the evening.—F. HEATHERLEY; 79, Newman Street, W., September 19, 1878.

TAPINOSTOLA HELLMANNI IN MONK'S WOOD.—I took two specimens of *Nonagria Hellmanni* while sugaring in this wood, on Tuesday, August 6th, 1878. I believe this to be an addition to the fauna of Monk's Wood.—H. HEBBLETHWAITE; 15, Grove Terrace, Bradford, Yorkshire, September 9, 1878.

MIANA ARCUOSA AND **PLUSIA INTERROGATIONIS** NEAR LONDONDERRY.—I have to record the capture of these two species near Londonderry. I believe *M. arcuosa* has not been taken in Ireland before, and only one specimen of *P. interrogationis*. The former was taken by a friend of mine, Mr. J. Milne. I bred three specimens of the latter, and also captured a few.—W. H. CAMPBELL Ballynagard House, Londonderry, August 16, 1878.

HELIOTHIS SCUTOSA IN CO. DONEGAL, IRELAND.—I had the good fortune to capture a specimen of this rare insect in co. Donegal on August 19th. It was slowly flying over the heather on the side of a small hill on the sea-shore, about 3.30 p.m. As I did not know the species I sent it to Mr. Birchall, who kindly named it for me.—W. H. CAMPBELL; Ballynagard House, Londonderry, September 23, 1878.

AGROTIS AGATHINA AND **THERA FIRMATA** AT SUGAR.—Last Saturday night I took *Ayrotis agathina* at sugar for the first time, although I have sugared in the same locality each autumn for some twenty years. We have taken them hitherto at flowers, or on the wing. I have likewise taken a fine series of *Thera firmata* at sugar, this season.—W. PREST; 13, Holgate Road, York, September 18, 1878.

BOLETOBIA FULIGINARIA.—On July 15th I captured a nearly perfect specimen of this rare moth in a garden here. It is a female, and I got a few eggs from it, though these were unfortunately infertile.—C. G. NURSE; Southgate Green, Bury St. Edmunds.

EMMELESIA TÆNIATA LARVA.—Of this hitherto unknown larva I have at last succeeded in rearing some from eggs. It has baffled me for years to find any special plant to feed it upon. The most likely plant was the enchanter's nightshade. Of this I have beaten acres to no purpose; in fact it seemed a hopeless task even to discover whether the larva was green or brown, or what it was like. Now, however, I am able to give its history up to date. During the month of July I spent nine days in the lake district, and paid special attention to getting this species, as usual. The species only comes out of the dark woods when worn. I secured about a dozen females, all of which I kept to lay eggs. About twenty eggs hatched in

the second week of August. I put in the glass along with them *Hypericum*, enchanter's nightshade (*Circœa lutetiana*), dead nettle (*Lamium*), groundsel (*Senecio vulgaris*), knot-grass (*Polygonum aviculare*), and many other plants; and last, not least, a leaf or two of the garden nasturtium. Several of them went to work by making a round hole through a leaf of the latter plant,—one appearing to take better to it than the others,—the rest seem inclined to hibernate, while this one is nearly full fed. It is quite seven-eighths of an inch long; and the following is a rough description:—Ground colour of the back and sides a rich dark salmon, tinted brown at each segment; on the back there is a pale pink lozenge-shaped spot, darker at the edges, and in the centre of the spot is a clear black wedge-shaped mark; the colour on the back at the anal extremity becomes much paler for three-eighths of an inch, and there are two rows of spots of a brownish black down to the anal point; the sides and abdomen are of a pale pinkish yellow, with no other markings than two spots at each segment underneath of this shape; legs same colour as abdomen; the head slightly darker, with short scattered hairs. The habit of the larva is much after that of *Emmelesia unifasciata*: when touched it frisks about, as if it wanted to be played with. I have made a rough sketch and coloured it, so that it may be a guide for another day, until more is known of this northern species.—J. B. HODGKINSON; 15, Spring Bank, Preston, September 12, 1878.

CAMPTOGRAMMA FLUVIATA AT SOUTHPORT.—I took this day, on the sandhills between Freshfield and Southport, Lancashire, a perfect female specimen of *Camptogramma fluviata*, which I venture to think worthy of record in the pages of the 'Entomologist.'—HASTINGS DENT; 112, Bury New Road, Manchester, August 23, 1878.

MICRO-LEPIDOPTERA LARVÆ ON HACKNEY MARSHES.—During the past three weeks I have met with the following species:—The blotched appearance of the leaves of willow betrayed the presence of *Gelechia notatella*, of which I secured about fifty; and on the same bush were a number of the cones of *Gracillaria stigmatella*; but the latter had mostly quitted their feeding places and retired to the under side of the leaves, where their white, silvery-looking cocoons were not so readily seen. *G. Nævisferella* occurred in the leaves of *Chenopodium*, but were scarcer than usual. *G. Hermanella* were tolerably common on the same plants

in sheltered situations, but their mines are far less distinct than the conspicuous white blotches of the preceding. *Coleophora paripennella*: this appears to be a general feeder, having myself found the cases containing larvæ occasionally on wild apple, elm, hop, willow, hawthorn, bramble, blackthorn, dewberry, birch, and hazel, but they give a decided preference to the latter; they are comparatively common this year, and I doubt not may be collected for the next two or three weeks. Among thistles in a well sheltered situation I found eight full-fed larvæ of *Coleophora Therionella*.—W. MACHIN; 22, Argyle Road, Carlton Square, E., September 18, 1878.

THE SEAT OF THE SENSE OF SMELL IN INSECTS.—Those who contend that the antennæ of insects are their organs of scent are sometimes told that there is a total lack of direct observations in support of their view. Whilst declining to admit this assertion (see 'Nature,' July 18, 1878, p. 302) I must beg to mention a few observations I have made upon wasps, and which doubtless numbers of entomologists will be able to confirm from their own experience. That wasps have an acute scent, and seek their prey or their food by its means, will be I think generally admitted. When a wasp alights upon a table, a window, or any other surface, and begins running about in quest of booty, its antennæ are kept in constant play, touching the surface on which the insect is travelling in all directions, in a manner which strongly resembles the action of a dog when seeking something by scent. This week I saw a wasp take a dead house-fly and begin devouring it, its antennæ being all the time rapidly and incessantly touching the carcase. Now we can readily understand an animal sniffing at its food; but no one surely ever saw or can conceive of any creature applying its organs of hearing to the object it was devouring. Another wasp having found a dead companion on a shelf began to eat it,—the only instance of cannibalism I have noticed in the species,—using its antennæ in precisely the same manner. When a wasp is flying it keeps its antennæ advanced and extended, so as to be in the most favourable position for receiving the impression from any odoriferous substance. These facts I submit agree perfectly with the hypothesis that the antennæ are the organs of scent. That they may possibly subserve other senses, also, I do not seek to deny.—J. W. SLATER; 3, Bicester Road, Aylesbury.

INSECTIVOROUS PLANTS.—Referring again to the subject of

insectivorous plants, introduced in the September number of the 'Entomologist' by Mr. Corbin (Entom. xi. 197), I must say that I think the use of the various epidermal appendages of plants has not yet received sufficient attention, since doubtless through the hairs, glands, &c., plants obtain a large proportion of their food; in fact these appendages may be considered as embryo roots. Take for example a plant growing in rich moist soil, and observe the more generally glabrous character of its foliage; and then observe even the same species in an arid situation, and see the profusion of hairs with which it becomes covered, acting doubtless not only as means to obtain food by absorption of nitrogen from the dew, &c., but also for protecting the plant from too great heat or cold. Besides the plants noticed by Mr. Corbin as insectivorous *Saxifraga tridactylites* may be added, as being able not only to retain, but also to assimilate, insects; and the various Saxifrages,—*Saxifraga geum*, *S. umbrosa*, *S. granulata*, *S. hirsuta*; *Chrysosplenium*; &c.,—all are clothed with hairs extremely sensitive to ammonia, as discovered by Dr. Darwin, and on which insects frequently get caught. The various *Silenæ* are named catchflies, from the same property; but as yet I have not found that assimilation follows the capture of insects by them. This property is possessed also in a large degree by the lovely *Menziesia polifolia*, the viscosely hairy peduncles always having some Diptera attached. I have noticed also insects dead or dying on *Diotis maritima*, in Jersey; on *Picris hieracioides*; on *Silene conica*, *S. quinquevulnera*, *S. anglica*, *S. noctiflora*, and *S. nutans*; and on *Cerastium tetrandrum*: the latter had several small beetles adhering to it, *Epilobium parviflorum*. On the connate leaves of *Dipsacus* plenty of insect debris is always to be found; and Mr. Francis Darwin has recently made a most interesting discovery of the means by which nutriment is obtained from the liquid contained in these connate receptacles. *Senecio viscosus* and *S. sylvaticus*, *Sonchus arvensis*, *Hyoscyamus niger*, and various *Orobanchaceæ*, also have been noticed with adhering insects. It is worth remembering that plants entirely destitute of hairs, notably our indigenous *Orchidaceæ* and *Siliaceæ*, generally have excessive root development, as bulbs, tubers, &c.; and also that the *Orobanchaceæ*, often parasitic upon plants totally insufficient to yield the nourishment for such large plants, are covered with long glandular hairs, through which a very considerable portion of nutrition must be obtained; and like the *Drosera*, *Pinguicula*, *Corallorhiza*, *Neottia*

nidus-avis, &c., are almost destitute of chlorophyll, although it exists in a passive condition in many of these plants. Attention to this interesting subject must yield many important discoveries; and to none could the study be more suitable than the readers of the 'Entomologist.'—G. C. DRUCE; Northampton Natural History Society.

ADDITIONS TO THE DOUBLEDAY COLLECTION.—The notice in the exchange list of the September number of the 'Entomologist,' that fresh specimens of no less than 238 species of Lepidoptera are required for the "Doubleday Collection" at the Bethnal Green Museum, must surely be a matter of surprise and regret for the majority of entomologists. In this regret I fully share, but I must confess that I am not surprised. Soon after the Collection was received at Bethnal Green, and before the public were admitted to see it, I went through it, and called the attention of the authorities of the Science and Art Department, at South Kensington, to the fact that many specimens were in imminent danger of destruction by mites, and offered, as a labour of love, to endeavour to check this threatened destruction. In consequence of my letter I was asked to meet Mr. Matchwick (under whose control, I believe, are the natural-history collections) and the late Mr. Andrew Murray. It was then decided that, previous to moving infected specimens, a catalogue should be made, and that then the mites should be attacked. The making of this catalogue I superintended, and I understood Mr. Murray would then eradicate the mites. Immediately after the demise of Mr. Murray I heard that the destruction of the specimens was progressing, and I again wrote to the authorities at South Kensington Museum offering my services. My letter was acknowledged, and an answer promised,—which, by the bye, I have never received. The mites in the interval have, I presume, had it all their own way, otherwise a request would not now be made for 238 species. I am afraid that the want of care,—I can call it nothing else,—which has permitted this loss of Lepidoptera, will not encourage entomologists to come forward to jeopardise further specimens; besides the Collection will be the "Doubleday" Collection but in name, if it is to be formed of specimens with which Mr. Doubleday had nothing to do. The proposal revives the story of Jack's knife; and of the celebrated old musket, of which nothing remained but the touch-hole. I notice the appeal is made "out of respect for the memory of the Founder." Out of such respect I made my offer of free service. Surely respect would have been

better shown by preventing the loss of the specimens.—A. B. FARN; Dartford, September 9, 1878.

[In justice to Mr. Murray it may not be out of place to mention that the immediate cause of his last and fatal illness was the amount of chloroform inhaled by him when working for the preservation of the Doubleday Collection. At first he used the chloroform every day; then he attended once a week; but succumbed altogether at last. Whether the remedy was a wise one is not now under discussion.—E. A. F.]

THE DOUBLEDAY COLLECTION.—The announcement in the exchange list of the September number of the 'Entomologist,' that this collection is to be put "in proper order," by adding "fresh specimens," &c., will I am sure be received with painful surprise by many of the lepidopterists of this country. The great interest which centres in the Collection at Bethnal Green arises solely from the fact that it is *the Collection* formed by the late Henry Doubleday, and, as such, is looked upon by the present generation of lepidopterists with a feeling almost akin to reverence. Once begin adding to, or taking from it, and this interest ceases for ever; and the Collection at once descends to the level of that of any ordinary museum. With proper care it will keep, *as it is*, for many years to come. I grant, of course, that the contemplated "improvements" would make it more valuable in an educational point of view. If the museum authorities want a collection for this purpose (and every museum ought to have one), let them get a new cabinet and start a fresh collection; when I venture to say our lepidopterists will send their duplicates to it with far greater alacrity than they will in the former case.—G. T. PORRITT; Highroyd House, Huddersfield, September 3, 1878.

TAPINOSTOLA BONDII.—I observe in the exchange list of the 'Entomologist' for September the above species offered, and marked *bred*. This must surely be an error, otherwise someone is, I fear, losing the great credit due to so important a discovery. Also in some of the exchange notices would it not be better to distinctly notice which were British insects, and which continental types.—W. PURDEY; 132, Dover Road, Folkestone, September, 1878.

[This was a compositor's error, owing to bad copy: the word "bred" applied to preceding species, *Cynipiformis*, as printed in August number. Continental specimens should always be so designated; but see notice at head of exchange list.—ED.]

THE ENTOMOLOGIST.

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[No. 186.]

IDENTITY OF EPHIPPIPHORA OBSCURANA (Steph.) AND E. GALLICOLANA (Zell.).

By WALTER P. WESTON.

WILKINSON, in his work on the British Tortrices, describes this species as *Semasia obscurana*, which description Mr. C. G. Barrett, in his excellent "Notes on Tortrices" (E. M. M., vol. x. p. 144), considers more applicable to *Gallicolana*, Zell., and he then gives his reason for his opinion, and the chief points in which that species differs from *Obscurana*, which are "the greater breadth of the fore wings, the more upright, clearer, and whiter dorsal blotch, and the more richly coloured apical space." Mr. Barrett then gives Stephens' description of *S. obscurana*, Steph. I have always been disposed to consider these two insects as one and the same species, thinking *Obscurana* to be only smaller and worn examples of its congeners, to which it is most closely allied; but it was only this season that I bred sufficient numbers to satisfy myself as to their identity. For the last four or five years I have captured a few specimens of *Obscurana*, Steph., every year, and amongst them one which closely answered the description of *Gallicolana*, Zell. Mr. Barrett, however, to whom I sent it, returned it to me as a variety of *Obscurana*, but closely approaching *Gallicolana*, having the costal spot white and very decided, but the fore wings were hardly broad enough.

Last season I collected several oak galls (chiefly those of *Cynips terminalis*), from the very trees round which I had been accustomed to take *E. obscurana*, and succeeded in rearing four undoubted specimens of *E. gallicolana*, all of them being larger than *Obscurana*, the ground colour of the fore wings darker, and the costal blotch very clear and decided, but as variable in shape as it is often found in different examples of *E. cirsiana*. These specimens, which consisted of one male and three females, were all 8 to $8\frac{1}{2}$ lines in expanse.

Following up my success I bred this year, from galls from the same locality, seventeen or eighteen specimens, varying greatly in size, intensity of colouring, and in the shape and size of the costal blotch. Of these the largest was close on nine lines across, and the smallest under six lines. In some the costal blotch was clear and white, in others it was traversed by two distinct brownish lines, darkest on the costa and sloping towards the apex of the fore wings, and in the remaining examples the blotch was more or less suffused with a brownish tinge.

I was only able to capture two examples this year, but my friend Mr. Howard Vaughan, who was more fortunate, kindly lent me his series for comparison. Nearly all the captured specimens are considerably lighter than the bred ones, and the costal blotch, instead of being white, is of a light brownish grey tinge, in which the darker traversing lines mentioned by Wilkinson are very distinct. Noticing that the more worn a specimen was, the darker the costal blotch became, and the nearer it assimilated to the ground colour of the fore wings, and thinking the white blotch might be formed by an outer layer of scales which would soon wear off with the flight of the insect, I allowed a bred specimen, with a very distinct white blotch, to remain in the breeding cage. It fully answered my expectations, on the second day of its existence the blotch being of a light brown colour, and the velvety appearance of the fore wings having entirely disappeared. Altogether it presented a most distinct appearance, so far as colour was concerned, from its bred companions. In none of my specimens have I been able to find the "lustrous blue markings towards the apex of the front wings," as mentioned by Wilkinson. According to the custom of priority of nomenclature, Professor Zeller's name, *E. gallicolana*, should be adopted for this species.

Ephippiphora gallicolana must be considered as a local rather than a rare insect. It is to be found at Tilgate Forest, and, nearer London, at Epping and Darenth Wood. I have also taken it at West Wickham and Highgate Woods; but my first specimens came from a small oak copse close to the Alexandra Palace, and I am sorry to say since destroyed. It flies at dusk round the boughs of the oaks, and always high; its flight is slow and steady, which enables it to be at once distinguished from *Phoxopteryx Mitterbacheriana*, which is usually out in abundance at the same time. The time of

appearance of the moth is somewhat irregular, occurring from the middle of May to the middle of June, but the latter end of May is the best time to look for it. *E. gallicolana* may be reared from the galls of *Cynips terminalis*, which are to be found in plenty in the autumn, and it prefers those of the preceeding year's growth. When the imago emerges the pupa case is left sticking half-way out of the gall, and in some cases the moth emerges by the hole eaten by the *Cynips*, but in others makes one for itself, and in this case a small beautifully round cap of the outer surface of the gall is pushed out and left at the side of the pupa case.

I have bred this Tortrix from some galls from which the *Cynips* has never emerged, and which had no apparent hole in them, clearly showing that the larva must have lived in them, and could not have gone into them to pupate as *Heusimene fimbriana* undoubtedly does. I have never found more than one moth emerge from each gall, and the proportion of galls containing this insect is two or three per thousand.

This insect seems somewhat out of place in our lists, being far more closely allied to *Coccyx argyрана* than to *Ephippiphora populana*. As in *C. argyрана*, the posterior wings of the males have a wide pale patch in the centre, surrounded by a darker outer margin. Indeed in shape and markings it very closely resembles that species, being distinguished from it by the uniform dark brown ground colour of its fore wings, and by its later appearance in the imago state. From the same lot of galls I reared four *C. argyрана*, a few *C. splendidulana* and *Heusimene fimbriana*, besides two specimens of both *Catoptria Juliana*, and *Eupæcilia maculosana*, the latter not being usually considered an inhabitant of galls in any stage of its existence.

1, Duncan Terrace, N., October, 1878.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. X. NYMPHALIDÆ — NYMPHALINÆ.

(Genera allied to VANESSA, continued.)

AMONG the commonest and most widely distributed of the exotic butterflies are those belonging to the genus *Junonia*. As now restricted, it includes several species with smooth

eyes (those of the *Vanessæ* are hairy), and with fore wings but slightly emarginate, and hind wings rounded and slightly dentated. They are insects rather larger than *Vanessa Urticæ*, of a black, brown, or occasionally greyish colour, generally adorned with two eyes on the hind wings and one towards the hinder angle of the fore wings. Several species are common in every collection from the East Indies, such as *J. Lemonias*—brown, the eyes with blue pupils, and standing in reddish orange rings; the fore wings are spotted with buff. *J. Laomedea* is of a slightly iridescent grey, with transverse zigzag brownish lines, and a row of rather small eyes beyond the middle, of which two towards the tip and one towards the anal angle of each wing are more distinct than the others, and consist of an outer brown ring, an inner grey or buff one, and a black pupil surmounted with orange. Another East Indian species is *J. Orithya*, a rather smaller insect; the fore wings black, with buff apical markings, and the hind wings broadly blue towards the hind margin. The eyes consist of two black rings, separated by a red one, and the inner one nearly filled by a lilac spot. The African *J. Clelia* resembles this, but is larger; the hind wings are black, with a very large round blue spot at the base. The same character is repeated in the African and Asiatic *J. Cænone*, but the centre of the fore wings and the marginal half of the hind wings are filled up with pale orange, and the eyes are very small and inconspicuous. *J. Asterie* and *J. Almanæ* are both fulvous, with two eyes on each wing, that nearest the tip of the hind wings being very large, purplish, marked with a large black spot, surmounted by two small white ones, and enclosed in a buff ring partly surrounded with black. *J. Almanæ* is more angulated than *Asterie*; the hind wings are produced into a lobe at the anal angle, and the eyes of the under side are very indistinct. The Australian *J. Vellida* is brown, with the eyes very broadly surrounded with fulvous, and the fore wings with two fulvous markings in the cell and buff markings towards the tip. The South American *J. Lavinia* closely resembles this, but is very variable, and many of its varieties have received different names. *J. Cænia*, from the Southern States, is of a light brown, with the eyes surrounded with buff, and the first eye of the hind wings as large as in *Asterie* and *Almanæ*.

Precis, the largest genus of the present group, is African, though a few are East Indian. The wings are generally dentated; the fore wings generally more or less angulated,

and occasionally almost hooked, and the hind wings often produced at the anal angle. We rarely meet with large eyes, as in *Junonia*, though sometimes with a row of small ones towards the hind margins of the hind wings. The beautiful blue *P. Rhadama* of Madagascar, however, has eyes placed as in *Junonia*. The species of *Precis* are generally brown, sometimes almost without paler markings, but they are generally banded with some shade of fulvous, and occasionally marked with blue or red. The species are too numerous to describe in detail. The beautiful brown and fulvous *Thaleropsis Ionia*, from Asia Minor, is allied to this genus.

Rhinopalpa is a Malayan genus, including a few large species, three or four inches across the wings. The fore wings are angulated and almost hooked, and the hind wings are nearly square, with a strong projection in the middle. *R. Polinice* is fulvous, with black borders, and *R. Sabina* dark brown, with a broad tawny band across both wings, and a large spot near the tip of the fore wings.

The African genus *Salamis* resembles this in size and shape. *S. Anacardii*, a remarkable iridescent butterfly, is at once the commonest and the best known species of the genus. *Napeocles Jucunda*, the only South American species allied to *Junonia*, is a large black insect, with hooked fore wings and rounded hind wings, a broad blue band across the centre of all the wings, and a blue spot near the tip.

NOTES ON ACIDALIA CONTIGUARIA.

By S. J. CAPPER.

I SPENT the month of July, 1874, at Llanfairfechan, North Wales, devoting every spare hour to the collecting of Lepidoptera, in which pursuit I was assisted by two or three of my sons and my late friend Mr. Alfred Owen. On returning from Penmaenmawr one evening we were pleasantly surprised on opening our pill-boxes to find a specimen of *Acidalia contiguaria*. This species had then become, as we believed, almost extinct. Mr. Greening, of Warrington, who had been in the habit of breeding the insect, had lost all his larvæ. The source of Mr. Greening's specimens was, I believe, one fertile female, captured near Bangor. At the time of which I now write we were about to leave Llanfairfechan in a few days, so we devoted our time to the most diligent search, and were fortunate in obtaining a few more specimens.

The following July I spent with my family at Penmaenmawr, when, pursuing our search for *A. contiguaria*, we took a few dozen specimens, and I sent eggs to friends; but none were successful in rearing the larvæ.

Last summer (1877) we spent at Llandudno, and nearly every day visited the locality for this moth, and were again successful. I gave Mr. Sidebotham, who was staying at Llandudno, several living specimens, and both he and myself were this time fortunate in rearing the insect.

This July we again spent at Llanfairfechan, but for some reason or other the insect was not so abundant as in former years, and with the greatest diligence we could only take very few specimens.

The distribution of this moth, I believe, extends all over the heath-clothed mountains of North Wales, for we have taken occasional specimens from Conway to Aber, and I know a few specimens have been taken at Bethod-e-Coed. Excepting a few specimens taken on the wing, quite at dusk, all our captures were sitting on the rocks. We have spent evening after evening trying to take the moth on the wing, as it seems natural to expect the flight at dusk, but hitherto we have met with very little success; and I am inclined to think they are at no time very active.

In captivity the moth is double-brooded, the first brood appearing in July, and the second towards the end of September or early in October. The larvæ feed on heath, knot-grass, and chickweed.

Huyton Park, Liverpool, October, 1878.

NEW BRITISH CRABRO.

By EDWARD CAPRON, M.D.

DURING the past summer I took a fine male *Crabro*, belonging to the group with *scutellate* anterior tibiæ, which I could not refer to any described British species. I have lately shown it to Mr. Frederick Smith, who, on referring to the continental specimens of the Museum, found it to agree entirely with *Crabro pterotus*, Panzer, a species which inhabits France, Germany, Austria, and Sweden. As this is the first recorded instance of its capture in England I subjoin a short description of it:—

CRABRO PTEROTUS, *Panzer* (mas).

Length $4\frac{1}{2}$ lines. Exp. alar. 6 lines. Head black, closely and moderately finely punctured; stemmata in a curve; clypeus and inner orbits with silvery pubescence; mandibles ferruginous in middle. Antennæ with flagellum broadly filiform, flattish; first seven joints ferruginous beneath, last four and scape entirely black. Thorax slightly pubescent, diffusely and strongly punctured. Anteriorly a slight depression, in the centre of which is an elevated line, and two shorter ones laterally. Metathorax very coarsely rugose; scutellum smooth, with a few fine punctures. Femora black, middle pair with a broad yellow streak above; lower margin quite smooth, not denticulate, as in *C. patellatus*. Tibiæ yellow, anterior pair dilated into a convexo-concave plate, which is black, and streaked with well-marked whitish radiating lines. Posterior pairs with a slight ferruginous stain in the middle above. Tarsi yellow, with last joint fuscous. Anterior pair dilated, and last joint produced into a triangular plate, having two short acute spines, one pointing forwards and the other backwards. Abdomen elongate-ovate, black; second segment with a roundish yellow macula, having sometimes a black centre, and forming a nearly perfect circle on each side, and a semilunate yellow patch laterally and towards the apex of the third segment. Hab. Shere, Surrey, July, 1878.

Shere, near Guildford, October 15, 1878.

LIFE-HISTORIES OF SAWFLIES.

Translated from the Dutch of Dr. S. C. SNELLEN VAN VOLLENHOVEN,

By J. W. MAY.

(Continued from vol. x., p. 279.)

CRYPTOCAMPUS ANGUSTUS, *Hart*.

(*Hartig, Blatt und Holzwespen*, p. 222, No. 1.)

Cryptocampus niger, in latere nitidissimus, antennis in mare elongatis brunneis, supra fuscis, in femina brevioribus totis nigris, alarum stigmatibus bicolore, pedibus dilute fulvis, coxis, femorum basi et tarsorum ultimis articulis nigris.

As an appendix to the description of the previous species,* which lives in excrescences on the leaves, I add the histories—very imperfect, it is true—of two species of sawflies,

Nematus Lugdunensis, Voll.

the larvæ of which live in the interior of the branches of the willow. I must premise that I am unacquainted with the larvæ themselves, and I begin to fear it may be years before I have an opportunity of seeing them, even if I ever do so; it seems to me that for their better recognition it may be as well to publish the description of this species after that of the sawfly inhabiting the leaf. I was the more unwilling to keep back the description of *Lugdunensis* until I had met with these larvæ, as it is uncertain whether the latter of the two pith-dwellers occurs in the Netherlands, a fact which does not appear from the description by De Geer. By the kindness of Mr. C. Ritsema I received two individuals of *Cryptocampus angustus*, a dead male, and a living female, with the twigs in which were the cocoons, and in which the insects had undergone their metamorphosis. The twigs consisted of the top ends of the common willow (*Salix cinerea*); they had been cut off in the neighbourhood of Oegstgeest, and because there was a hole in one of them they had been opened, one being found to contain a part of a cocoon. At the time they were cut off it was rather cold—it was in the month of March—and there was, consequently, no immediate prospect of the insects inhabiting them making their appearance.

The cocoon found in the hollowed-out pith of one of the branches was cylindrical, with rounded ends, its substance being thin but tough; the colour was pale purplish brown. I am unable to determine whether the larvæ had fed on the pith of these willow-twigs during their whole lives, or whether they had hollowed out the pith merely for the purpose of spinning up. According to what Dr. Hartig states, it might be assumed that the larva had inhabited the interior in the earlier stages of its existence instead of first feeding upon the leaf. This point, must thus be left for determination by future entomologists. The following is a description of the two sexes :—

Male.—Length, five millimetres. Shining black, glabrous. Head but slightly prominent, broad, with two grooves anteriorly along the eyes, hollowed out posteriorly; eyes projecting, these latter black and shining. Trophi brownish; the margin of the labrum hairy; mandibles black at the tips, palpi fuscous. Antennæ two-thirds the length of the body and moderately thick; the first two joints black, the remaining joints dark brown on the upper side, pale brown on the under side; on the last joint (the ninth), there is a small bent

up knob, as if there were a tenth joint. Thorax but little wider than the head, entirely black, even the apices of the prothorax being of that tint; the sides very shining. Wings strongly iridescent, nervures brown, costa fuscous; stigma whitish in front, dark grey behind. Abdomen narrower than the thorax, elongate, entirely black, with the exception of a tinge of pitch-brown on the anal valve. Legs black from the insertion of the coxæ to two-thirds of the length of the femora, the remainder reddish yellow, excepting the last joint of the intermediate and posterior tarsi, which are dull black.

Female.—Four to five millimetres. Resembling the male, with the following exceptions:—Head somewhat more projecting; antennæ not longer than half the body, entirely black and thinner; ninth joint shorter than the eighth, and wanting the bent knob at the end. Abdomen broader in the middle than the thorax; the valves of the saw project very far, and are covered with hairs; above them are two abdominal processes. The saw is of a very pale brownish yellow.

As regards coloration, this insect entirely agrees with *Pristiphora testaceicornis* of St. Fargeau, as described by that author and Stephens, but it is entirely different as regards the neuration of the wings, as in the species described by the writers above mentioned the first submarginal cell is stated to be very large, and to receive the two recurrent nervures which in the present species are received by the second submarginal.

CRYPTOCAMPUS MUCRONATUS, Klug.

(Hartig, *Blatt und Holzwespen*, p. 223, No. 2.)

Cryptocampus niger, in dorso thoracis subpubescens, antennis in mare brevibus, crassis, brunneis, in femina brevioribus nigris, alarum stigmatibus in femina tantum bicolore, pedibus e brunneo luteis, coxis fere totis nigris.

I am not sure whether this species is indigenous, but as it occurs in the countries both to the east and west of us, in Germany and England, it may be considered probable that it is to be met with here. I add the description to that of the preceding species on account of the great similarity of the two.

Mucronatus lives in the sickly swollen twigs of a species of willow (*Salix*); I received the galls, if I may so call them,

from my friend, Professor Westwood, at Oxford, but without any notes, except that the twigs were from the willow; I received at the same time a quill containing some imagos, both male and female, produced from the galls.

I conclude that this is the species described by De Geer in his 'Memoirs' (German translation, vol. ii. p. 271 *et seq.*, pl. 39, f. 1—11), and by Dahlbom in his 'Clavis novi Hymenopterorum Syst.' (p. 28, No. 38), and called by the latter *Nematus Pentandræ*, mihi, with a reference to Linnaeus' 'Fauna Suec.' (ed. 1, num. 943.) According to both these writers more than one larva is contained in these galls, that is to say, two, three, or four, or even five living together; they remain in this state until the end of April, when they change to pupæ, still within the gall. The larvæ are greyish, and toward the end of that stage they acquire a purplish tinge. The cocoons are thin, and of a coffee-brown colour. The pupæ are greyish white with a purple tinge; those of the male are smaller than the pupæ of the female; the eyes, though probably only towards the end of the pupa state, are dark red. The imagos, it seems, appear in the middle of May; they gnaw a circular hole in the gall, through which they make their escape.

The following is the description of the imagos which were sent to me:—

Male.—Length, 5·5 millim. Shining black, with an extremely short and fine whitish pubescence on the head and thorax. Head somewhat more protruding than in the former species, and destitute of grooves. Trophi and cheeks very pale brown, except the tips of the mandibles, which are shining black; palpi pale brown. Upper lip pubescent. Antennæ not more than half the length of the body, thick; the joints sharply divided from each other and thickened below; the first two joints black, the others brown, darker towards the base on the upper side. Thorax narrower than the head, very shining on the sides, with brown tegulæ. Wings iridescent, nervures black; stigma black, with the exception of a brown spot at the base. Abdomen narrower than the thorax, shining black, with the exception of the anal valve, which is of a brown tint. Coxæ black nearly to the tip, apophyses pale brown; femora blackish at the base and thence brown, of which colour are the tibiæ and tarsi, except the posterior tarsi, which are blackish.

Female.—Somewhat smaller. Exactly similar to the male, with the following exceptions:—The antennæ are shorter,

and entirely black as far as the last joint, which is brown. The abdomen somewhat thicker, the valves of the saw black and hairy, the anal processes projecting considerably. From half-way the femora the legs are entirely red-brown and shining, with the exception of a longitudinal black line on the under side of the femora. The wings have the stigma white at the base.

NOTES ON COLLECTING IN GLEN TILT.

By F. BUCHANAN WHITE, M.D., F.L.S.

It is a very long time since Mr. Douglas, climbing up Ben Ghlo, found the first British specimen of *Pachnobia alpina* sitting on a rock, and contemplating (let us suppose) the beauties of Glen Tilt. After having yielded *Pachnobia*, no more is heard, entomologically, of Glen Tilt for many years, when the announcement is made that *Crambus myellus* has been captured there. Again the glen rested for a few years till a favoured few had opportunities of exploring its inmost recesses, and bringing to light its hidden treasures.

Those collectors who have been "privileged" to visit the happy hunting-grounds of Rannoch must not think that Glen Tilt is at all similar in its physical features. In the one case you have a large lake surrounded by extensive woods of birch or fir, giving way in many directions to natural meadows or heather-clad moors, and backed by mountains of various altitudes and at various distances. In the other, at least in so far as the part of it I am about to describe is concerned, you have a long and very narrow valley, through which darts a rapid mountain stream, from whose banks the hills rise, almost directly, in steep green slopes, topped here and there by rugged rocks or banks of loose stones. Trees there are almost none, except a few alders and birches beside the river, or in some of the almost inaccessible ravines, down which the tributary streams pour their waters into the Tilt. Lower down the glen trees become more numerous, and at Blairathole form large and varied woods, but in the part of the glen where most of our collecting has been done trees are few and far between. Through the glen goes a rough road, connecting Blairathole and Braemar, and which is only a bridle-path for many miles. (I ought to mention that though this road can be used by the public, there is no liberty to go off it, and that all the district is strictly "preserved" and well guarded).

With these preliminary remarks I will now invite my readers to accompany me on a short excursion, promising not to take them more than a half a mile or so from the house where our head-quarters are. Within the grounds are three or four trees, and off one of them we begin the day well by taking *Anticlea sinuata*. This is rather a surprising capture in an alpine glen, but is not unparalleled, for on a stone close at hand we find *Melanippe galiata*, *Larentia cæsiata* and *Emmelesia ericetata* sitting side by side, and, on a rock about a stone throw off, *Larentia ruficinctata*. Take a look at that bed of yellow saxifrage, *Saxifraga aizoides*, and after boxing a few *Zelleria saxifragæ* we will begin to ascend the hill. Here we see abundance of the pretty flowers of the rock rose, and flitting about them *Lycæna Artaxerxes* gives many an opportunity of using our nets. Mounting a little higher, we carefully scan the large stones that dot the slope, and are soon rewarded by finding *Dasydia obfuscata* and *Plusia interrogationis*. A dark moth rises, and after a short chase is secured, and turns out to be a very fine *Stilbia anomala*. Coming to a ravine, we very quietly and cautiously inspect an overhanging rock, and find *Eupithecia constrictata* and *E. pulchellata*, sitting amidst a host of *Larentia cæsiata*, &c. A particular rock of this character (*i. e.* overhanging a mountain stream) is known to us as the "*sinuata* rock," because it has more than once yielded *Anticlea sinuata*. Further up the stream we notice a number of moths flying gently about and settling on the grass stems. These we soon discover to be *Ablabia argentana*, a moth which at first we thought was confined to one place in the glen, but which we now know is distributed over several miles. Along with it, if we are lucky, we may get *Scopula decrepitalis*, but it is rather late in the season for that species. (By the way, I would take this opportunity of asking any one who knows the habits of this species to kindly give me some information about it. I have only met with it twice, once in Inverness-shire, and once in Glen Tilt, and in both times it was in a ravine. What I wish to know is, at what time of the year is it most abundant, and what is its hour of flight?)

Pursuing our way up the stream, we come to some grassy slopes, over which *Erebia Epiphron* is flitting about; as usual, in more or less damaged condition. We have now to cross a slope of loose stones, and had better keep a sharp look-out for *Crambus ericellus*, which, in Glen Tilt at least, frequents such places, and has the provoking habit of diving into the crannies where it is impossible to get at

it. On these stones, too, we take *Scoparia muralis* and *S. atomalis*, which latter is, I think, nothing more than an upland form of *ambigualis*. We have now attained a height of 800 or 900 feet above our starting-point, which was 1000 feet above sea-level, and have passed the steepest part of the slope. The vegetation here begins to change its character, large beds of *Vaccinium*, of several kinds, replacing the rock-rose and other plants which adorned the lower part of the hill. The slope also is not at so great an angle. We now begin to meet with some of the more alpine insects, though some of those we have already noticed still maintain their ground. *Larentia salicata*, though not confined to this altitude, is certainly more common, and as the afternoon advances begins to fly freely. We also find that variety of *Chelonia plantaginis*, which has the usual yellow markings replaced by white, but it too can be found lower down. A curious form of *Coremia ferrugata*, which puzzled us for a long time, occurs up here as well as lower down, as does *Coremia munitata*. The latter may, however, be taken more freely flying at dusk. Amongst the bilberry we will find *Penthina Staintoniana*, which requires the sun to be shining to tempt it out. This species was at first supposed to be attached to the bear-berry, *Arctostaphylos uva-ursi*, with which plant it has no connection. In damp grassy places *Scopula uliginosalis* affords some employment for our nets; and so we go on, picking up various species, till we reach the ridge of the hill. Here only a very stunted vegetation grows, composed of heather, grass, the mountain azalea, &c., leaving many dry, bare, stony places. Advance cautiously to such a place, holding the net in readiness. See, a black shadow rises from a small stone and flits away. Get the net over it, and behold! you have taken one of the most alpine of our native insects, *Psodos coracina*. There is still another, even more alpine species, and if we are lucky we may meet with it, but we must go higher first. Passing over some peaty ground, we search among the cloudberry, *Rubus chamaemorus*, a very humble relation of the familiar lowland raspberry and blackberry, and catch sight of a little moth somewhat like an *Argyresthia*. Carefully searching, we fail to net any specimens, and what the beast was remains a mystery to this day. Our private idea is that it is an unknown new British species, and if we are not so fortunate as to solve the enigma, let us hope that some one else will. *Apropos* of the cloudberry, we have found the leaves mined

by a *Nepticula* which we suspect is the North European species, *tristis*.

We now come to a higher plateau, similar to the one we have just left, and commence to search for *Pachnobia*. Carefully inspecting stones is rather slow work when not rewarded by finding anything, and the stones are legion (even when the amusement is varied by getting an occasional *Psodos* who comes to see what is going on), so we try tearing up and examining the moss. This is a little more lively, as an empty chrysalis-case (not to mention numbers of a bug new to science, *Orthezia Signoreti*) rewards our efforts, but after a while we tire of that too. A herd of red-deer galloping past attracts our attention, and then, "Hi! mark that thick body," and in half a minute more the net is over *Pachnobia* as he flies past. After a more or less (probably very much less) successful search for more, we turn our faces homewards, and finish up the day by sugaring the palings and stones near the house, where, if fortunate, we may get *Crymodes exulis*, and then go to our well-earned beds and dream of all the new things we *may* get next day.

In this slight sketch of the Lepidoptera of Glen Tilt, I have merely mentioned the chief species that have been taken within half a mile or so (as measured on the Ordnance map*) of our head-quarters, and do not mean to say that we took them all on one day, though I believe that that would be quite possible. On another occasion I may describe a day's collecting in another part of the glen.

Perth, October, 1878.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

ABSENCE OF *COLIAS EDUSA*.—As for the "absence of *Colias Edusa* in 1878" I can answer for its scarcity in Swanage (Dorset), Weston-super-Mare (Somerset), Sheerness (Kent); and, while in other years I have caught them in some of the woods round Highgate, I have not seen one this year.—M. B. H. LANE; 70, Junction Road, Highgate.

ABSENCE OF *COLIAS EDUSA*.—In reply to Mr. McRae, I have not seen a single specimen of *Colias Edusa* this year near Taunton, Somerset, where last year I saw it in great pro-

* That is, on the level. The difference in altitude between our starting-point and the *Pachnobia* plateau is very nearly 2000 feet, so the intelligent reader can calculate what the working distance is. I make it about an hour and a half's steady walking up a very steep hill.

fusion. I may also add that in Switzerland I only saw two specimens, where I captured *C. Hyale* in great profusion.—R. ADAIR; St. Leonards.

SCARCITY OF *COLIAS EDUSA*.—I captured one specimen of *C. Edusa* at Exmouth at the beginning of August, but in this locality, though very common last year, I have not seen a single specimen, so that my opinion coincides with that of your correspondent.—E. C. DOBREE Fox; Castle Morton.

DISTRIBUTION OF *APATURA IRIS*.—With respect to the distribution of *Rhopalocera*, and the eastward thinning of *Apatura Iris*, lately in question, I can affirm that this species was formerly abundant in pheasant copses at Botley, Hampshire. It was also taken at Fareham.—A. H. SWINTON; Binfield House, Waterden Road, Guildford, October 11, 1878.

HYBERNATION OF *SATYRUS ÆGERIA* IN THE PUPA.—I should be glad to know if it is unusual for *S. Ægeria* to hibernate in the pupa. I have a few larvæ which have been kept as naturally as possible on couch grass, one of which turned to a pupa on the 10th, and the others are nearly full fed.—R. M. SOTHEY, Sunny Side, Hastings, Oct. 15, 1878.

VARIETY OF *VANESSA IO*.—I have to record a variety of *Vanessa Io*. I took the larvæ on July 10th, at Grange, and bred two specimens of the variety; it is entirely without the red-brown scales on the fore and hind wings, which gives it a curious semi-transparent tint.—HENRY MARSH; Wellington Street, Leeds, August 26, 1878.

EXTENDED NOTES ON BREEDING *DEIOPEIA PULCHELLA*.—From the insects mentioned (Entom. xi. 186) I obtained one hundred eggs, only one-third of which hatched; the few I retained were treated in the same manner as the previous brood; they fed exclusively on *Myosotis palustris*, and did extremely well, for by August 20th (twenty-five days from egg) the first larva spun up; three more had done so by August 25th (my other larvæ in different stages were sent to various friends). These four pupæ produced moths on September 10th, 12th, and 16th, two being males and two females. After being together four days, copulation took place, lasting fourteen hours; the female deposited a few eggs each night for a fortnight, and then died. All these eggs were barren.—W. H. TUGWELL; 3, Lewisham Road, Greenwich, October 15, 1878.

PARASITES OF *DICRANURA VINULA*.—On July 31st my brother found a *Dicranura vinula* larva, which he gave to me. The day afterwards I found on it five little black things,

which I thought were smuts. On August 17th I looked at it to feed it, and I found two small green larvæ and three tiny little beetles; the beetles were black, about as big as a speck of dust. When I took them off a transparent liquid flowed out.—S. C. CURTIS; Totteridge House, Totteridge, Herts, August 18, 1878.

ACRONYCTA ALNI LARVA.—Whilst out collecting at Colgrave, on August 3rd, I was lucky enough to find one larva of this rare moth feeding on hawthorn; it has since gone to pupa, and I hope to rear the imago in its season.—W. WATCHORN; Mount Street, Nottingham.

ACRONYCTA STRIGOSA IN WORCESTERSHIRE.—I took two specimens of this *Noctua* in my garden during the past summer. Both specimens were taken at sugar at about a quarter to twelve.—E. C. DOBREE FOX; Castle Morton, Worcestershire.

TAPINOSTOLA BONDII.—This species was bred in 1863 by Mr. Henry Nicholls, who found the larva feeding in the roots of a grass which grows in large tussocks along the Sandgate Road. The grass is *Arrhenatherum avenacerum*. Early in June Mr. Nicholls noticed that in these grass-tussocks some of the stems looked sickly, and by gently pulling them they broke off close down to the roots. A close search disclosed either a larva or a pupa. He collected several of each, and believing them to be *Bondii*, he sent some to the late Mr. Henry Doubleday. From those Mr. Nicholls kept he bred several *T. Bondii* and two *Miana furuncula*, which latter species feeds in much the same manner. Mr. Nicholls gave up collecting some seven years since when his collection and cabinet came into my possession, also his entomological letters, amongst which I find one from the late Mr. H. Doubleday, acknowledging the receipt of the *Bondii* larva. The bred specimens of *Bondii*, with the empty pupa cases pinned beside them, were in the cabinet when it came into my hands, so doubtless any one desiring the larva of *Bondii* may obtain it next year as indicated, but of course it is far easier to get the perfect insect.—W. H. TUGWELL; 3, Lewisham Road, Greenwich.

LEUCANIA EXTRANEA AND L. VITELLINA AT TORQUAY.—I had the good fortune to capture at Torquay, on September 13th, at sugar, a very perfect female *Leucania extranea*, and on the following evening a female *L. vitellina*. On the 16th I found at rest on grass a second specimen of the last-named species.—A. H. JONES; Shrublands, Eltham, Kent, Oct. 1, 1878.

LEUCANIA VITELLINA AT TORQUAY.—On the evening of September 14th, in company with my friend Mr. A. H. Jones, of Eltham, I captured at Torquay a very fine male specimen of *Leucania vitellina*.—R. S. STANDEN; Holmwood Lodge, Surbiton, October 4, 1878.

SERICORIS BIFASCIANA, &c.—I met with *Sericoris bifasciana* in a garden at Mill Hill, Middlesex; it was very common on one particular fir tree; several other trees of the same species did not produce it. *Pædisca oppressana* on trunks of the aspen; *Dichelia Grotiana* beaten from hawthorn hedge, under oaks; and *Coccyx nanana* very common among *Abies excelsa* in the same garden.—R. SOUTH; 277, Camden Road, N.

ARGYROLEPIA MUSSEHLIANA AT DEAL.—Mr. Barrett has identified some Tortrices I captured at Deal last summer as the above-mentioned species. It is certainly strange that this long-lost species should have occurred in two such widely separated localities as Kent and Pembrokeshire. Your readers will recollect that the only locality given by Mr. Stainton in his Manual is Devonshire.—H. VAUGHAN; Bromley, Kent, October 21, 1878.

PTEROPHORUS RHODODACTYLUS AT MILL HILL, MIDDLESEX.—I have found the larva of this species in flowers of dogrose on several hedges in this neighbourhood; one especially good locality is the lane at the back of Buns Farm. I have also found it in the garden on moss roses.—R. SOUTH; 277, Camden Road, N.

CAPTURES NEAR LIVERPOOL—Colias Edusa.—In 1877 I took twenty-five *Edusa* and one var. *Helice* in one day. The members of our Entomological Society also had taken or seen many specimens of the same insect, so I think the word plentiful might be applied to their appearance in this neighbourhood in the year 1877. But in the present year not a single *Edusa* has been seen by me, and all who have been afield here assure me they have seen none, nor have they heard of any being seen. *Acherontia Atropos*, another occasional visitor to this neighbourhood, has turned up, and I have throughout this month (October) obtained twenty-six pupæ and one larva, the latter on October 19th; the pupæ are all alive. They were found amongst the potatoes on two farms a few miles out of Liverpool. I was not aware of their visit until many had been destroyed by the potato-gatherers, who called them “stingin’ things.” The farmer being a friend of mine, I soon got within speaking distance of his

diggers, well knowing what might turn up with the tubers. On showing them an old pupa they recognised it at once, stating they had smashed all they had seen, thinking they were something hurtful. I asked them to preserve them for me, and they have done so, to the advantage of farmer, diggers, and myself. *Arctia caja* was picked up, October 19th, by one of these men, and brought to me alive. Is not this a very unusual time for the imagos of this species?—T. WEST; St. Leonard's Terrace, Ashfield Street, Liverpool.

LEPIDOPTERA IN 1878.—The present season is the very worst I think on record. Some species, like *Nemeobius Lucina* (a common thing), have actually disappeared from localities where they were plentiful in 1877. The same tale of scarcity reaches me from America; and during a fortnight in France I did not see a hundred specimens of all kinds together. *Colias Hyale*, generally so common, was there represented by one. By the bye, I saw a *C. Hyale* at the end of July on the Cotswolds, near Wootton-under-Edge. I also took one *Lycæna Arion* on June 29th, in a stone quarry on Stinchcombe Hill, on the Cotswolds. *L. Alsus* was plentiful at the same time.—A. J. SPILLER; Mangotsfield, Bristol, August 24, 1878.

CAPTURES AT DEAL.—Amongst numerous species I have met with at Deal during the past summer may be mentioned *Lithosia pygmæola*, *Eubolia lineolata* (pretty varieties), *Crambus alpinellus*, *Homæosoma sinuella*, *Nyctegretes achatinella*, *Phycis adornatella* and *P. ornatella*, *Melia anella*, *Euchromia purpurana*, *Sciaphila perterana*, *Catoptria fulvana*, *Eupæcilia hybridellana* and *E. rupicolana*, *Argyrolepis subbaumanniana* and *A. Dubrisana*, *Pterophorus parvidactylus* (one very pale example reminds me of *Lætus*), *P. zophodactylus* (Loewii), *P. tephrodactylus*, *P. microdactylus*, and *P. baliodactylus*.—H. VAUGHAN; Bromley, Kent, October 21, 1878.

PARASITES OF DEPRESSARIA HERACLIELLA.—On July 30th I was passing a bed of cow parsnep (*Heracleum sphondylium*), and just above the second joint of one of the largest plants I observed two holes. On cutting it down and opening it I found fifteen pupæ of *Depressaria heraciella*. I opened others and obtained fifty-eight pupæ: from them I bred fourteen moths and thirty-seven ichneumons (*Ichneumon vacillatorius*). Seven pupæ are standing over, but I believe they are infested. *I. vacillatorius* does not make a pupa-case, the metamorphosis taking place within the pupa of its

victim. I also obtained two larvæ which were infested with a species of *Chalcididæ*, the two larvæ producing sixty-three imagos, these forming pupa-cases or cells within the larvæ.—G. C. BIGNELL; Stonehouse, Plymouth, October 6, 1878.

CLASSIFICATION OF INSECTS.—Having read with interest certain essays from the pen of the late Edward Newman, that have appeared from time to time on the classification of Insecta, may I be allowed to call attention to additional evidence adduceable from the evidence of the higher organs of sensation—sight and hearing? Here the presence of auditory organs and well-developed eyes place the Orthoptera first in the list; these would be followed by Homoptera (*Cicadidæ*), where the auditory organs are highly developed, but sight less potent; next to which appear to come Lepidoptera, where the *Nocturni* have well-defined auditory organs, and the *Diurni* excellent optic organs; then would follow Coleoptera, which certainly give evidence of possessing auditory apparatuses in two groups, *Lamellicornia* and *Longicornia*, although in the latter the visual organs are imperfect. As far as I can learn the species of Hymenoptera, Neuroptera, and Diptera, have the auditory sense, if present, less potent; but sight, smell, and touch are evident. This perfectly harmonizes with the circular view given in the Ent. Mo. Mag. iv. 236.—A. H. SWINTON; Binfield House, Waterden Road, Guildford, October 11, 1878.

APHIDIVOROUS CHARACTER OF THE TELEPHORIDÆ.—I have further confirmed my last season's observations on the Aphidivorous character of the *Telephoridæ*. I have many times seen, *e.g.*, *Rhagonycha melanura* sitting on the flower of a thistle, and on a hasty glance it might seem to be seeking honey like the bees and butterflies; but on closer inspection the insect's head was always found turned to the outside of the calyx, and in every case *Aphides* were there present. In this district the *Telephoridæ* have been much scarcer than usual. This season also I have not seen a single *Byrrhus* along a certain road where, during the summer of 1877, I met with them daily.—J. W. SLATER; 3, Bicester Road, Aylesbury, August 7, 1878.

STRIDULATION OF PELOBIUS HERMANNI AS EXPRESSION OF EMOTION.—I recently put a specimen of *Pelobius Hermannii* in water with a *Ranatra linearis*. The *Ranatra* seized at the beetle but missed it, when the beetle sounded its usual shrill grating note as though under the influence of fear or anger.—A. G. LAKER; Court Hill Road, Lewisham.

DRILUS FLAVESCENS (FEMALE) NEAR ASHFORD.—On Whit-Monday last I picked up an example of the above-mentioned rarity crossing a road on the Chalk Hills. Never having seen a female *Drilus*, but perceiving my captive was a perfect insect, though very larva-like, I forwarded it to Mr. Champion, who kindly determined the species for me. Wishing Mr. Champion to see it alive, I placed it in a jar with a banded snail or two, but it refused to feed, and after a few days laid about two dozen eggs, and died. My example is consequently a poor one. The eggs were not fertile, or I should have tried to learn something of its natural history.—T. H. HART; Kingsworth.

BRACHINUS CREPITANS.—I have observed that the little bombardier beetle has been exceedingly plentiful this year, and I feel interested to know if this has been the experience of others. I caught my first specimen in March, and this was the first I had ever seen here; since then, and till quite lately, they have appeared in great numbers. On the South Downs, near Eastbourne, I also saw several of these insects, though I have no recollection of having observed them there before. Altogether *Brachinus* seems to have been an exception to the general scarcity of his order this year. It is a very sociable insect, and I have seldom seen one without finding others close by. These beetles are very partial to my sugar compound, and have swarmed on trees prepared for moths. *Colias Edusa* has quite disappeared from here this year.—F. G. HOPKINS; Ridgeway, Enfield.

MOWING OPERATIONS OBSTRUCTED BY BEES.—On June 27th last my man was cutting clover with a mowing machine, and hearing that he was continually stopping I proceeded to the spot to enquire into the cause. He informed me that the mower was choked by the quantity of "mouse-nests" that got on the finger-points. I picked up one of the said nests lying near, and to my surprise found it contained not young mice, but a mass of about a dozen pupa-cells of some bee. I then examined all I could find, and with the same result. The nests were beautifully formed of grass-shreddings, with apparently only one opening. From the contents of one nest I reared two perfect insects, which were somewhat larger than the honey-bee, stouter in proportion, and covered with thick gray pubescence. I have no doubt the species is well known to entomologists, but it has not come under my observation before, and consequently excited my curiosity.—T. H. HART; Kingsworth, Ashford, Kent.

[This bee was undoubtedly *Bombus sylvarum*, a very generally distributed species.—ED.]

LEPISMA SACCHARINA.—Will you kindly name the enclosed insect for me? It was found by myself in a chest of China tea, on August 18th.—F. B. STREET.

[The insect forwarded, which was found in the chest of tea, is that well-known little household pest, the common fish-scale (*Lepisma saccharina*). These degraded little insects are especially partial to the contents of the store-room or book-case. They are of nocturnal habits, swiftly running away to some shelter when disturbed by day. Sir John Lubbock from time to time published his "Notes on the *Thysanura*" in the Linnean Society's Transactions: these subsequently developed into that important and beautiful "Monograph of the *Collembola* and *Thysanura*," issued by the Ray Society in 1873.—E. A. F.]

CELERY FLY.—Will you kindly let me know the name of the insect of which the enclosed represent the larva? They have almost destroyed the whole of the leaves of my celery (six rows of ten yards each). My gardener tells me he has seen them some years ago, and that they will not injure the edible part of the plant.—W. H. HEATON.

[These small green maggots, which live in blotches between the cuticle membranes of the celery leaves, are the larvæ of a pretty Dipterous fly belonging to the genus *Trypeta* of Meigen. They blotch the leaves only, and are not injurious to the stalks unless present in extraordinary numbers, or from a very early attack on the young late plants. This year they are, however, especially abundant and destructive in and around London; I know of rows in metropolitan gardens of which the leaves are completely gone, looking as if they had been scorched or burnt up; in such cases they must be injurious to the well-being of the plants. Pinching the larvæ when in the leaf is a sovereign remedy where practicable and attended to. It is also usual to grow celery on almost the same ground year after year; where the insect is troublesome this should be avoided as much as possible.—E. A. F.]

REVIEW.

European Butterflies and Moths. Parts 1 to 7. By W. F. KIRBY. Cassell, Petter & Galpin. 4to. 1878.

THIS work, which is illustrated by coloured plates, is based upon Berge's "*Schmetterlings-Buch*," and is written by our

well-known correspondent Mr. W. F. Kirby, who is assistant naturalist in the Royal Dublin Society's Museum. Being published in monthly parts, at a low price, brings this useful and popularly-written book within the reach of all our readers; we strongly recommend it to the notice of those who have not yet obtained it. The plan of the work is so simple that it will be found most useful to beginners in the study of Lepidoptera, as well as to those of more extended experience, whether they desire a knowledge of the European species, or simply to follow the insular tastes too common to many of our fellow-workers in Britain. To the latter students it will teach what allied species are to be found on the Continent, even within a few miles of our shores. We fear we are correct in saying that many of our oldest British collectors would be puzzled to state off-hand how many species were represented in Europe by the genus of—say for example—*Argynnis*. This insular exclusiveness amongst British Lepidopterists is perhaps not so much the result of any bias, as of the difficulty hitherto found in obtaining a good book upon the subject, printed in English, and within the reach of reasonable means. In supplying such an important desideratum as this, Mr. Kirby has, we believe, taken the first step towards breaking through this prejudice, and it now only requires a fairly good system of interchange of specimens between British and Continental entomologists to make the study of European Lepidoptera as popular amongst our readers as has been that of their native forms. This brings us to the question of the fictitious value set upon certain well-known and even common continental species of Lepidoptera which have been rarely captured in these islands. That this should be so, in the cause of scientific knowledge, is much to be regretted, we think no one can for a moment doubt; one result of this unfortunate and totally fictitious difference in the value being that the majority of English collectors are afraid if they send a rare British form abroad, they thereby lose a chance of enriching their own cabinets and simply waste a valuable "specimen," forgetting that their collection should be ranked rather as a dictionary than a mere monument to their acquisitiveness. As an example of this want of general knowledge of the various European forms of a certain species, may be quoted the introduction and long continuance in our British list of *Dianthecia Barretti*, a species which has been relegated by British Lepidopterists even to a wrong genus. There is

little doubt that other so-called exclusively British moths will eventually prove to be either melanic or other varieties of some previously known European species. We may here remind our readers that many English insects are in great request amongst Continental entomologists, and that purchase is by no means absolutely necessary, although in many cases it is the most convenient way of obtaining examples from localities which are far apart. We cannot forbear again congratulating the author upon striking this, by Englishmen, comparatively unworked vein of literature, for we are sure his work will bear fruit, if only by giving many British Lepidopterists an opportunity of pursuing a new line of thought.

Mr. Kirby has written a very useful introduction to his work, extending to considerable length. This is not an ordinary preface, but a really useful working manual of primary instruction to the would-be Lepidopterist. It is so simply written that the reader is not tired with dry scientific detail. It is further helped by a useful plate of anatomical diagrams of the various parts of a lepidopteron. This will be especially useful to the beginner, who will find not only these details, but also instructions how to collect, set, and arrange his specimens. Besides the coloured plates, showing types of genera, there will be found in the letter-press explicit descriptions of the types and varieties of species, their size, geographical description, food of larvæ, and, best of all for the English reader, well-known British insects are taken for comparison when the insect under description is not known to occur in this country.

The spirited publishers deserve support for the care taken in the production of this work. When we consider that it is issued in very large numbers, the plates are fairly good; and we should feel pleased that we live in an age when such a work can be issued to the public so cheaply.—[J. T. C.]

OBITUARY.

THOMAS W. WONFOR.—This gentleman, whose name has long been familiar to all classes in Brighton, died at his residence, 38, Buckingham Place, Brighton, on Sunday, the 20th October last, in the fifty-first year of his age. Although the deceased had only been seriously ill for some three weeks before his death, his health had been failing him for years past, and he was frequently unable to leave his house for

weeks together. His entry on a public career in Brighton was first made in connection with the Royal Literary and Scientific Institution at the Albion Rooms. Shortly after the formation of the Brighton and Sussex Natural History Society, in 1853, Mr. Wonfor was appointed an Honorary Secretary, a post he continued to fill to the date of his death, and the duties of which he discharged with exceptional ability and energy. At the meetings of this Society, from which he was rarely absent, his extensive knowledge and unfailing good humour rendered him a universal favourite, and his death leaves a vacancy which it will be almost impossible to supply.

The papers communicated by Mr. Wonfor to the 'Proceedings of the Brighton and Sussex Natural History Society' are very numerous, and the excellence of many of them has obtained for their author a more than local reputation.

It was as a microscopist that Mr. Wonfor chiefly distinguished himself, and one of his papers, "On certain Butterfly Scales characteristic of Sex," read at Brighton in November, 1867, was subsequently published in the 8th vol. of the *Microscopical Journal*, and is alluded to by Mr. Darwin in his 'Descent of Man,' &c. In addition to this may be mentioned his papers, "On the Eggs of *Articulata*," "On the Scales of Insects," &c., &c.

Besides his very numerous papers on microscopical subjects, Mr. Wonfor contributed a great number on Entomology, and nearly every other branch of Zoology, not only to the Proceedings of his own Society, but to 'Scientific Opinion,' 'Science Gossip,' and various other periodicals.

On the occasion of the visit of the British Association to Brighton in 1872, Mr. Wonfor took a very active part in their proceedings, and acted as Secretary to one of the committees.

Although the deceased never attained the position of a distinguished scientific specialist, few men ever possessed so large an amount of general information on scientific matters, or have been more ready to impart it for the benefit of others, than the amiable and accomplished gentleman, who for nearly a quarter of a century has laboured so assiduously for the intellectual improvement of his fellow townsmen.

Mr. Wonfor was appointed Curator of the Free Library and Museum in 1875; he was elected a Fellow of the Linnean Society in June, 1877, and a member of the Entomological Society of London in February last.—H. Goss.

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THE LARVA OF CHIRONOMUS PLUMOSUS (BLOODWORM).

By EDWARD COX.



Fig. 1.—CHIRONOMUS PLUMOSUS: magnified 4 diams.

ALL the figures of this larva that I have seen are alike; and they are evidently taken from Réaumur's 'Memoires,' which were published about 140 years ago. When I noticed that Réaumur's figure had only 10, or perhaps 11, segments, instead of 13, I thought it might be incorrect in other respects. So I obtained some living specimens, and kept them in small glass vessels.

Having closely watched and carefully examined many of these specimens, I find that Réaumur's figure, and the copies of it in Kirby and Spence's 'Introduction,' Burmeister's 'Manual,' &c., are, as I suspected, inaccurate.

This larva has four prolegs (fig. 1); the pair on the second segment have their ends fringed with closely placed hairs, and are not unlike the prolegs of caterpillars. The other pair, which are on the last segment, have each fifteen (?) brown



Fig. 2.—Magnified 50 diams.

claws. These claws are unequally bidentate plates with incurved teeth; they differ in size and shape (fig. 2), and

are attached by one end to a central spot at the end of the leg, where they stand with their shorter convex edges next to the foot, the teeth being directed outwards; and together they form a radiate tuft which can be retracted by the muscular axis of the proleg. I know that these prolegs have been termed "air-tubes," and "respiratory organs;" even the anterior pair are called "air-tubes" by Burmeister; but, without considering their structure, the way in which they are used as organs of prehension and locomotion ought, I think, to convince any observer that they are really prolegs. Besides, this larva keeps always under water, never coming to the surface for air; consequently, air-tubes would be useless. There are four egg-shaped appendages at the extremity of the abdomen, the upper two of which are larger than the others. There are only three in Réaumur's figure, and these are equal and cylindric. Near each end of the penultimate segment are two fleshy indistinctly jointed worm-like filaments,—these are not well represented by Réaumur.

The larva has four eyes, two on each side of the head; two strong, toothed mandibles, with other oral organs, and, no doubt, a spinning apparatus; for it collects any small pieces of dirt which come in its way, and fastens them together by threads, and so makes an irregular tube, in which, holding by its prolegs, it waves its body up and down, thus producing a current which brings it food, and at the same time a fresh supply of water to its branchiæ. Sometimes it will come out, when, holding by its anal prolegs to any slight web it may have made, it will search for food, its jaws working incessantly and its head moving up and down, while it twists itself about in all directions with restless activity. Occasionally it will remain comparatively quiet, resting on its anterior prolegs, then reminding one of a pig with its feet in the trough, groping for a *bonne bouche*. It generally remains concealed, and only when disturbed, or when seeking a fresh resting-place, is it seen swimming about with that peculiar writhing motion which everybody has observed. There are a few scattered hairs about the head and thoracic segments, and two scanty tufts on a protuberance on the top of the anal segment.

The pupa of this insect also has been incorrectly represented. In the figures that are copied from Réaumur the abdomen has a segment more than it should have; the branchial tufts on the thorax are too symmetrical, and the hairs too scanty; the wing-cases are not of the right shape, and the tubes which contain the legs of the coming gnât are not shown.

These, when the pupa is *ripe*, lie between the undeveloped wings, extend a little beyond them, and then curve backwards (fig. 3). The imago of this, and probably of some allied species also, emerges from the pupa-case with surprising celerity. This wonderful transformation is performed in less time than a man takes to change his coat. When the pupa comes to the surface of the water, the skin of the thorax parts, the head and shoulders of the gnat appear, and it comes forth steadily as though some one were squeezing it out. In fifteen seconds it is free, and flies away!



Fig. 3.—Mag. 5 diams.

172, Acre Lane, Brixton, S.W.

NOTES ON CERTAIN SILK-PRODUCING BOMBYCES.

By ALFRED WAILLY.

(Membre-Lauréat de la Société d'Acclimatation de France.)

As many English entomologists now take an interest in European and Exotic Lepidoptera, I send you some notes on silk-producing Bombyces which have been bred in this country during the year 1878:—

SILK-PRODUCING BOMBYCES WITH CLOSED COCOONS.

Attacus Yama-Mai (Japanese oak-silkworm).—This species, reared in Britain for several years with very little success, is in the egg state during the winter. The moths, which pair with difficulty in confinement, lay their eggs in August and September. About a fortnight after the eggs have been deposited, if fertile, they contain a larva which remains in the egg till the end of April or beginning of May (according to temperature), before it makes its appearance. In warmer countries the young larvæ hatch earlier. The eggs of *Yama-Mai* must be kept in the open air protected from the rain and the rays of the sun. In case they should hatch before the oak leaves or buds should be sufficiently advanced to feed the young larvæ, small oak trees should be potted, and protected from the frost during the winter, but the trees

should never be forced in a hot-house. When the young worms have hatched they can at once be placed on the young trees, and they will seldom wander. When larger, the worms must be placed on oak branches (plunged in water), one or two feet long. Small twigs must not be used, still less cut leaves, to feed the worms. Branches should be cut in the evening; never while the sun is shining on them. If these rules be observed, failure in the rearing of the larvæ will be avoided to a great extent.

For the rearing of young larvæ I have adopted with great success the following plan:—I have large bell glasses (with four or five openings on the dome) placed on saucers full of sand covered with a piece of paper. Small branches are stuck through the paper into the sand, and no water is required to keep the foliage fresh under the glass, which, of course, must not be put in the sun. The larvæ will there thrive till they are large enough to be placed on branches plunged in water. When necessary, the glass may be raised, so as to give free ventilation; as to the droppings, they can be removed by merely blowing on the paper. If the glasses be large enough, a certain number of the larvæ may be left under them, till they form their cocoons, although it is preferable to rear them uncovered when large. When under glass, as no water is required to keep them fresh, the branches may be short, and cut according to the size of the glass, but when plunged in water they must always be long; otherwise the foliage would get watery and cause the death of the larvæ. *Yama-Mai* worms should not be placed in the open air till June. They want shade and to be freely watered in hot weather. Ova of this species should always be obtained as early as possible, so that they should pass the winter in the locality where they are to be reared. This plan for rearing the *Yama-Mai* may be adopted for all the species of silk-producing and other large Bombyces.

Attacus Pernyi (Chinese oak-silkworm).—This species, a native of North China, is very easy to rear in the open air, and will feed, like *Yama-Mai*, on all species of oak. Being double-brooded, and a second rearing being extremely difficult, if not impossible, the cocoons obtained should be kept in the open air and in a cool place, so as to prevent the moths from emerging in the autumn. In spite of precautions, when the autumn is mild, some of the moths will emerge, but the majority of the cocoons will keep till May of the following season.

The young worms of *A. Pernyi* hatch in June or beginning of July, when there is an abundance of foliage to feed them. Besides this advantage over *Yama-Maï* it has another—the great facility with which it is reproduced, the moths always pairing in whatever place they may be. The cocoon is larger than that of *Yama-Maï*.

Attacus Polyphemus (*Telea Polyphemus*) from North America.—This most valuable insect, which produces a closed cocoon like the two preceding species, is polyphagous, thriving well on willow, birch, oak, nut, chestnut, beech, elm, &c. This species must be considered as single-brooded. It is so in Illinois and Michigan, at least when the larvæ are reared in the open air.

Several of my correspondents who, this year, bred *A. Polyphemus*, having obtained the moths in the autumn, it must be stated that the cocoons were kept in rooms, which should not be done if they are to be preserved till May of the following year, when the moths begin to make their appearance. It must also be borne in mind that many species of Lepidoptera which are single-brooded in northern countries may become double-brooded if bred in captivity or in warmer countries.

A. Polyphemus can be reared in the open air in this country. At the end of last July, previous to a journey I made to Paris, I left a few *Polyphemus* larvæ on small trees in my garden, nut, willow, and birch. On my return to London in September, I was much pleased to see fine cocoons on the trees, although the quality of the foliage was not good.

The larva of *A. Polyphemus* is most magnificent. In its last stage it is covered with forty-eight silver and eight gold metallic spots, the latter being on the first two segments. When the sun shines on the larva, which is of a fine green with small pink spines, it seems covered with diamonds.

The fine and strong silk of *Attacus Yama-Maï*, *A. Pernyi*, and *A. Polyphemus* could be seen at the Paris Exhibition. The silk of *Yama-Maï* is light green, *Pernyi* light brown, and *Polyphemus* white. Besides the three species mentioned, there are several others which produce closed cocoons, but as they have not, as yet, been bred in this country, no mention will be made of them.

(To be continued.)

RAMBLES AFTER RARITIES: LONDON AND
LYNDHURST, 1875.

By BERNARD LOCKYER.

PERHAPS, even should the greater lights on Entomology fail to find interest in the accompanying stray leaves from the diary of my last season's collecting, some of the lesser ones may not disdain to peruse them for the sake of such hints, as I can afford them, from the result of four years' experience in the New Forest.

At the beginning of the season I had but little in hand, save a few larvæ of *Mania maura* and *Noctua rhomboidea*, which for the sake of making their acquaintance, preparatory, as I hoped, to taking them in their native haunts, I had kept feeding on a pabulum, much esteemed by hybernating *Noctuæ*—viz. carrots—through the winter. *Tæniocampa miniosa* put in an appearance in my breeding cages in March, from larvæ collected at Lyndhurst the previous season.

On March 25th I packed up my collecting traps and went to Lyndhurst. Luckily the weather proved fine, but things were hardly forward enough for very successful operations in the entomological way. A delightful spring walk through the locality for *Leucophasia sinapis*—an enclosed plantation of young firs and oak, intersected, as is the case with all the newer enclosures, by very broad flowery rides (the haunt of *Hyria Auroraria*, *Acosmetia caliginosa*, &c.), and known to those initiated in the Government Survey maps as Park Hill Enclosure—only produced a few dozen of the pretty young larvæ of *Thera variata*, and a few of the, at that time, anything but attractive ones of *Ellopiæ fasciaria*. I think few would imagine that the really gaily-coloured full-fed larva of this insect had started in life so pachydermatous and ugly in general appearance.

Full of expectations of plenty of work amongst the spring-feeding *Noctuæ* larvæ I wended my way in the evening to the shades of the Hurst Hill Enclosure,—a wood to the west of the Brockenhurst Road, composed of oaks and horse-chestnuts about seventy years old, with an undergrowth of wild rose, sloe, hawthorn, and bramble, with here and there a clump of birch; the ground in summer carpeted by *Poly-podium* and various weeds, and intersected by a most annoying number of wide ditches overgrown with similar

plants. The wood is well situated for collecting, being between two heathy tracts of undulating country, till lately well supplied with birch copses, and surrounded by some of the finest old oak and beech woods in the forest,—such as Whitley (oak) Wood, between it and the Brockenhurst Road, and Gritnam (beech) Wood, between it and the Christchurch Road to the north-west (a locality for *Sarrothripa Revayana*). There is, moreover, an enclosure to the east opening out of it abounding in old fir trees (New Park Enclosure), and a farmyard at one corner. It was here in August, 1874, that I took varieties of *Cidaria immanata* at sugar, quite equal to those from Scotland; besides dozens of *Noctua rhomboidea*, and specimens of *Triphæna interjecta*, *Agrotis puta*, *Cerigo cytherea*, &c. Having sugared I took to larvæ hunting, expecting at least a few good things; but though I could hear the young creatures falling off their food-plants as I shone the light on them, I could not secure anything better than a minute individual, which I made out to be *Noctua brunnea*. This sort of thing, carried on till 10 p.m., grew rather back- if not heart-breaking; so after a round at sugar, which produced a few nice *Tæniocampa munda* and some common hibernated *Noctuæ*, I retired.

Next morning I made up my mind to a long stroll, and full of determination started for the confines of the forest. I passed through what seemed to promise to be glorious collecting ground, lying to the east of the Christchurch Road; and a most muddy ramble I had. I tried a little oak-beating about Rhinefield Sandys, where in 1874 one had but to tap the twigs to fill one's umbrella with such larvæ as *Diphthera Orion*, *Boarmia roboraria*, *B. consortaria*, *Eurymene dolabraria*, *Notodonta dodonæa*, *Tephrosia exter-saria*, &c.; but none of the expected *Roboraria* gladdened my eyes. This is the last and largest enclosure between Hurst Hill and the main road; and at Welperley, an extensive wood seven miles from Lyndhurst, I added to my store of *Thera variata* to the extent of three only. After crossing the rails near Holmsley with some difficulty, owing to the slipperiness of the ground, and tramping laboriously through two miles of woodland path by Wootton Copse Enclosure, I reached home *viâ* Set Thorns and Aldridge Hill, not too late to take another turn at sugar, whereat my only notable capture was one *Tæniocampa munda*.

Next day, after hard work in Park Hill Enclosure, I came back the richer by one *Ellopiæ fasciaria* and a few *Thera*

variata, and a solitary young *Boarmia roboraria* knocked off a young oak. Variety is charming, so I bethought me that I would change my field of operations, and in the evening I struck out for Pondhead Enclosure, on the other side of the Brockenhurst Road, and one of the favoured haunts of the graceful *Limenitis sibylla*. But I had little better luck here: the evening was chill, and my captures at sugar were one *Tæniocampa instabilis* and two *T. munda*. As to larvæ they eluded my search by the same gymnastic feat as before; and on reaching home I found my captures were confined to *Triphæna fimbria* and *Noctua triangulum*. Slightly disappointed the next day found me back in London.

April I devoted to hard night-work at Highgate and Hampstead, being anxious to verify my suspicions concerning some larvæ I took there first in 1872, and which I set down as *Triphæna janthina* and *Noctua baja*. I found larvæ commoner than usual. Between April 1st and June 16th I spent sixteen nights at this work: the result of my operations was about four hundred and fifty larvæ. In the spring (at Highgate especially) *Noctua brunnea* predominated; seventy-eight fell to my share. Next followed *Boarmia repandata*, which is most conspicuous from its pale colour, sticking out with arched back from the bramble twigs; but of this I only took thirty-two. Of *Noctua triangulum*, *N. festiva*, and *Aplecta nebulosa*, I took about two dozen each. Then followed *Triphæna orbona*, *T. janthina*, *Noctua augur* and *N. baja*, which were severally represented by about a dozen specimens. *Triphæna fimbria* was very rare near London; but at Lyndhurst in May it turned out *en masse* to greet me, and I could have taken hundreds, but contented myself with fifty-three. I also picked up stray larvæ of *Odonestis potatoaria*, *Leucania lithargyria*, *Miana strigilis*, and *Urapteryx sambucaria*. As I have already noted I captured in June about a gross of *Xylophasia scolopacina*, along with which I took the pretty larvæ of *Larentia didymata* (on grass, well under large clumps of undergrowth), *Tæniocampa gothica*, *T. cruda*, and *Cosmia trapezina*.

I may as well add here that I found that the usual colour of larvæ of *Noctua brunnea* may be better described as dull rosy red, not reddish brown. Pale and ochreous varieties run very near to *Noctua baja*, but may be separated by the position of the pale spot on the subdorsal line, which in

Noctua brunnea is in the centre of the segment, and in *N. baja* near the hinder end of it, and by the markings on the heads. *Noctua festiva* I find I described as ferruginous, in error. All those I took at large between 1872 and 1875 were either a peculiar tint of olivaceous ochreous, more or less clouded over with a dull pinkish, and with the hinder part of each segment appearing as an ill-defined, transverse, delicate rosy band, or else dirty ochreous or grayish ochreous; often with all the triangular marks pale raw-sienna brown. *Triphæna janthina* and *Noctua augur* are especially attached to hawthorn and sloe: the former (at Highgate, at any rate) has a lateral stripe of a delicate rosy tint, and is altogether a very translucent looking creature. I think it is rather odd that though the larva of *Noctua triangulum* occurs every season at Highgate I never took the imago at sugar or on the wing.

19, Burghley Road, Highgate Road, August, 1878.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

NOTE ON THE RARITY OF *COLIAS EDUSA* IN 1878.—During the present year I have seen but two specimens of *Colias Edusa*—one in June in the New Forest, and the other I took on October 15th near Lewes, apparently but just emerged from the chrysalis. Mr. J. H. A. Jenner, of Lewes, saw but one during the year; this was seen near the spot where I captured mine, but ten days later, viz. on October 25th.—J. JENNER WEIR; 6, Haddo Villas, Blackbeath, S.E.

ABSENCE OF *COLIAS EDUSA* IN 1878.—I have not seen a single specimen of this species this year, though last year the insect absolutely swarmed in the neighbourhood of Guildford and for miles round; the variety *Helice* also occurred, and I myself took one. Although *Colias Edusa* was so abundant that year, I did not see any specimens of *Colias Hyale*.—G. W. OLDFIELD; Weybank House, Guildford, November 4, 1878.

NOTES FROM HARWICH, 1878.—*Colias Edusa*.—The only specimen seen and captured here was a freshly emerged male on the 18th of August. Last year it was the most common butterfly here. *Acherontia Atropos*.—A fine specimen was caught on the 18th May. This autumn there has been a large number of larvæ and pupæ taken. *Liparis salicis*.—On the morning of the 27th June last thousands of these

moths appeared, having come over the sea. I was informed that they arrived at the break of day, and resembled a fall of snow—they were so numerous. They were also observed many miles at sea. On the day of their arrival they might be seen by hundreds at rest on the buildings facing the sea. I secured many fine specimens.—F. KERRY, Harwich.

CHÆROCAMPA CELERIO AT BRIGHTON.—I procured on October 4th the larva of the silver-striped hawk-moth (*Chærocampa celerio*); it was found in a garden at Brighton. It appears nearly full fed, and no doubt will turn in a few days. Being a very rare species, more especially in the larval state, I have much pleasure in recording its capture.—C. BRAZENOR; 39, Lewes Road, Brighton, October 5, 1878.

DEILEPHILA LIVORNICA IN GLAMORGANSHIRE.—A specimen of *Deilephila livornica* was captured at Merthyr-mawr, Bridgend, during the third week in August. It was in good condition, and was found on the dining-room window attracted by the light.—G. F. HAMPSON; Exeter College, Oxford.

NOTES ON BOMBYX QUERCUS.—I have often been at a loss to account for the great mortality amongst the larvæ of this species. From a partiality to the larvæ and imagos, I have generally collected as many as came in my way when out, but I never yet succeeded in bringing more than a small percentage of them to the perfect state. Whether this has been from lack of any special treatment I am anxious to learn, and probably these notes may call forth a few from others who have had similar experience with this species. During the present year I collected seven larvæ of *B. quercus* in different stages of growth, which fed well, and to all appearances maintained perfect health; they constructed cocoons, and I awaited their emergence, but not one moth came out. A few evenings ago I cut the cocoons open; four of them contained dried-up larvæ; the other three had partially undergone metamorphosis; none of them had been ichneumonated. Again, on referring to my entomological diary, I find on May 15th, 1870, I collected eight larvæ; these all fed well and duly spun cocoons, but no imagos emerged. In 1871 I took four larvæ, but obtained no imagos; in 1873 twelve larvæ spun, but I got no imagos from them; in 1876 they were unusually abundant and early, when between April 2nd and May 14th I obtained forty-five larvæ, the majority of which spun cocoons, the first on May 24th, and the last on July 9th; the first pair of imagos emerged on July 4th, another pair on the

8th, a female on the 10th, and another on the 12th, which, on being treated with oxalic acid, readily deposited a quantity of eggs, which to my surprise produced larvæ a few days afterwards. I had no males at the time in or near the cage. I am aware that this is not unusual with some species of *Lepidoptera*, but this is the first time it has come under my own notice. A similar case of parthenogenesis relative to this species is noticed by Mr. C. O. Groom Napier in the volume of 'Science Gossip' for 1868, p. 71. He says, in writing of this species, "One year I had many virgin females, some of which laid fertile eggs." I should be glad of any information which might lead to more successful rearing. I may remark that all my larvæ were fed indoors separate from other species, always being in reach of a plentiful supply of fresh hawthorn. It would be interesting to know whether this mortality is peculiar to this species in a state of nature.—R. LADDIMAN; Norwich.

SUGAR versus HONEY-DEW.—I have often heard friends complain of their sugaring expeditions being unsuccessful, and attribute failure to the counter-influence of honey-dew; but I cannot quite bring myself to believe that this is the true cause of non-success. During the seasons of 1875 and 1876 I had good opportunities of observing the result of honey-dew attraction as against that of sugar. The scene of my operations was a garden and orchard bordered by large oaks, elms, and aspens: on the trunks of these and a few fruit trees I spread my bait. Four plum trees of low bushy growth stood in about the centre of the garden: these were covered with a fine crop of *Aphides*, instead of plums; the leaves twisted and curled, presenting altogether a very dejected appearance in the day-time. The following table will show the relative merits of the artificial and natural attractions:—

JULY 9 TO AUG. 28, 1875.

	Sugar.	Honey-dew.
<i>Cosmia diffinis</i> .	76	11
<i>Noctua rubi</i> .	68	5
<i>Cosmia pyralina</i> .	60	7
<i>Caradrina blanda</i> .	54	43
<i>Cosmia affinis</i> .	42	16
<i>Mania maura</i> .	34	3
<i>Cerigo Cytherea</i> .	32	0
<i>Caradrina Alsines</i> .	14	6
<i>Tethea subtusa</i> .	0	4
„ <i>retusa</i> .	0	1

JULY 14 TO AUG. 15, 1876.

	Sugar.	Honey-dew.
<i>Caradrina blanda</i> .	40	27
<i>Cosmia diffinis</i> .	37	6
<i>Cerigo Cytherea</i> .	24	0
<i>Cosmia pyralina</i> .	17	9
<i>Caradrina Alsines</i> .	13	3
<i>Cosmia affinis</i> .	8	2
<i>Tethea subtusa</i> .	2	14
„ <i>retusa</i> .	0	4
<i>Tryphæna interjecta</i> .	0	2

A large number of commoner species visited the sugar, but very few the honey-dew; two or three *Geometræ* showed preference for the latter; and *Herminia tarsipennalis*, *Pyrallis fimbrialis* and *P. glaucinalis* were common on the former. On the whole the balance of species and individuals was decidedly in favour of sugar. On several nights visitors to my feast were scarce; but at that prepared for them by the *Aphides* they were even more so. On these occasions the invited must have had important engagements, which prevented their attendance at the rival banquets; and so passed on their invitations to certain earwigs and slugs, for these gentry were present in large numbers. I am inclined to think the condition of the atmosphere is the chief point upon which depends the result of our sugaring; but what that condition should be I am unable to say. In the month of August, 1876, I sugared almost every night; and I took a few notes as to the state of atmosphere, wind, direction and force, thermometer readings, moonlight, &c., but have been unable to go into the matter since. Next year I hope to do so, and shall be glad of any suggestions on the subject.—R. SOUTH; 277, Camden Road, N.

IS PERICALLIA SYRINGARIA DOUBLE-BROODED?—Upon referring to Newman's 'British Moths,' and some other entomological works, I find the above question answered in the negative, which is quite in accordance with my experience previous to this season. However, from the facts stated below, I now hesitate in giving that opinion. This year I took the first moth of the species mentioned upon July 4th, and saw the last on the 13th of the same month: from females taken I obtained four broods of larvæ, some of which were hatched on July 19th. A little later in the month I observed that something had commenced to feed upon a lilac; but unfortunately I omitted to search for the intruders until August 16th, when a larva nearly full fed was taken; the imago appearing on August 30th. Later on another search was made, which resulted in finding a pupa; the perfect insect in this instance emerged September 5th. I may add that these two moths are of a different shade to any others I have taken, a point which is quite in harmony with the second brood of other species in this group. Thus I am led to suppose that these caterpillars were hatched at the same time as mine, and consequently have produced a second brood. Can any of the readers of the 'Entomologist' kindly inform me if in breeding *Pericallia syringaria* they

have ever obtained a second brood?—H. T. DOBSON, jun.; New Malden, Surrey.

[Kaltenbach ('Pflanzenfeinde,' p. 437) gives this species as double-brooded, but that it is not normally so in Britain the following instances will show, although it occasionally occurs twice in the year. The most striking case is that of Colonel Stewart's, who, in 1864, had about twenty-five larvæ, which were all hatched within twenty-four hours; one only of these progressed rapidly, and emerged at the end of September, the rest hybernating as larvæ (Entom. ii. 102). Mr. Elisha also records an instance of part of a brood feeding up rapidly, the imagos appearing in August, whilst the remainder hybernated as larvæ (Entom. v. 170). This abnormal autumnal appearance of the imagos is again corroborated (Entom. vi. 13) by the Rev. Bernard Smith.—E. A. F.]

CLEORA VIDUARIA.—*Cleora viduaria* seems to have unaccountably disappeared from the New Forest, formerly its chief locality. Six years ago, about the end of July or beginning of August, Mr. George Gulliver, of Brockenhurst, saw a number of females in a worn condition sitting on the tree trunks. A few days afterwards he could find none, and has not seen a specimen from that time to this. I have seen none myself when I have been in the Forest; and as far as I can learn the disappearance is complete. The disappearance of *Orgyia cænosa* from Wicken Fen is explained in the September number of the 'Entomologist' (Entom. xi. 212), by the fact that the fen was flooded in 1875 and 1876; the moth, moreover, is again appearing in its old locality. There seems, however, no reason to be given for the disappearance of *C. viduaria*; and the unusual gathering of females above mentioned makes the fact still more strange. *C. glabraria* is to be found in the plantations around Brockenhurst in fair numbers at the beginning of August.—[Rev.] W. W. FOWLER; Repton, Burton-on-Trent.

APOSTEGA SPATULELLA IN ESSEX.—While looking over some insects, captured by me during this summer in South-east Essex, Mr. Sidney Webb kindly pointed out a specimen of *Opostega spatulella*. This species has hitherto, I believe, only been recorded from Devonshire and from North Essex.—JOHN T. CARRINGTON; Royal Aquarium, Westminster, S.W., November, 1878.

DIASEMIA RAMBURIALIS AND PIONEA MARGARITALIS AT FOLKESTONE.—I had the good fortune to take one specimen each of the above species near Folkestone, the former in the

beginning of October and the latter in July.—W. PURDEY; 132, Dover Road, Folkestone.

BRITISH HYMENOPTERA.—Among other less common *Hymenoptera*, I have taken here this year, *Myrmicisa Latreillii*, female and male, and one male of *Stenamma Westwoodii*.—E. CAPRON, M.D., Shere, near Guildford, October 15, 1878.

LIBELLULIDÆ IN LONDON.—During the first week in last September I observed on more than one occasion several dragon-flies sporting in the sunshine about mid-day, in Oxford Street.—R. T. GIBBONS; Cecilyne House, Cavendish Road, Brondesbury, N.W.

PARASITE OF SPHINX LIGUSTRI.—I have this summer bred three fine specimens of *Trogus lutorius* from three pupæ of *Sphinx ligustri*. The metamorphosis took place within the doomed pupa. On examining the pupæ after the parasites had emerged I found each of them about half-filled with thick creamy-looking matter, but no indication of a parasitic pupa-case.—G. C. BIGNELL; Stonehouse, Plymouth, November 6, 1878.

FURTHER NOTES ON ACRIDA VIRIDISSIMA.—Whilst staying by the sea last August, at Pendower Castle, on the east coast of Cornwall, I had ample opportunity of watching the habits of this species of Orthoptera, which abounded everywhere in the neighbourhood. I could not, however, discover satisfactorily what they do in the daytime, but I think the males spend it in a semi-dormant condition, whilst the females are engaged in procuring food. Such, at least, was the case with a pair I kept alive for some time. As the night closes in, the males crawl up the stalks of thistles, &c., taking their position generally with their heads downwards, preparatory to their nocturnal concert. Then the music begins, and all the hedges and fields for a mile round seem really to "burst" with the noise, causing the trees to almost tremble with the echo cast upon them from the surrounding hills. After sugaring, the sound used to be ringing in my ears for hours. This peculiar noise is produced by rubbing together two hard spots at the base of the elytra, and is intensely shrill and piercing. They are very bold whilst thus engaged, allowing one to get hold of the bush in which they are situated, dodging round the stalk if threatened by the hand. I have no knowledge of the female making any sound at all. When caught these insects are very ferocious, and will bite one's hand with vigour. So angry, indeed, was one

specimen that, while a young lady was teasing it when held in my hand by the leaping-legs, it actually jumped right off its legs in order to get at her, leaving them "kicking" in my hand; which circumstance much disconcerted the tormentor. Vegetable matter is, I think, generally considered to be the food of all grasshoppers; but my observations in one case showed me a very different state of things: of a pair that I kept alive in a gauze cage the female used to spend the whole of the day trying to catch small grasshoppers, which seemed to hold her in great terror. I have repeatedly seen her catch them and devour a part of them, nearly always breaking their necks first; and then she would, as a rule, drop them in a certain place, and then go after others. Is cannibalism usual with these insects? The male I observed eating the seeds of a dock plant that was growing within the cage. One male greedily drank some drops of moth-sugar that were spilt on a window-sill. They are not good hoppers, but can run fast, which is their usual method of locomotion. They are by no means such powerful hoppers as their congener *Clypeata*. This species, from what I have noticed, seems to have a decidedly maritime taste.—H. HODGE; 33, Almorah Road, Islington, N., October 14, 1878.

NEUROTERUS LÆVIUSCULUS.—During the present autumn the scarce oak-spangle gall of *Neuroterus læviusculus* has been remarkably plentiful in some districts; and having been so recently noticed as an English gall (Entom. x. 122) it would be of interest if some of our gall observers would mention how far north its spread (or its presence, this year) has been observed. In the neighbourhood of Isleworth it has been sufficiently plentiful for me to be able with a little search to secure specimens whenever they were needed. In West Gloucestershire, and about a mile west of Chepstow (Mon.), I found it on October 5th in great numbers on oak, cut back into low bushes in the hedge of a wood in a somewhat damp locality, where the infested sprays overhung or were close to a neglected ditch. The galls were remarkably good specimens, both as to development and the peculiar faint salmon-tint characteristic of this species; and on some larger leaves in a sheltered spot in one of the deep sunk Gloucestershire lanes hard by I found as many as four hundred on the back of more than one oak leaf, this number far exceeding any quantity of this gall that I have met with before on a single leaf. Around Maldon, Mr. Fitch writes me he has observed the galls of *N. læviusculus* in such numbers this year as

almost to take the place of those of *N. lenticularis*; and in the other localities I have named, the common oak-spangle gall has also been unusually absent. The fact of the oak leaves not being, as in some recent seasons, so overloaded with the common spangles as to leave little chance of growth to the more delicate species, is enough to account for a larger number of those, both of *N. læviusculus* and *N. fumipennis*, being observable this year; but in itself the small number of *N. lenticularis* which has been observable this autumn in some of its favourite haunts, whilst at the same time it has been remarkably plentiful in others, is of some degree of interest.—E. A. ORMEROD; Dunster Lodge, near Isleworth, November 12, 1878.

HAGGERSTON ENTOMOLOGICAL SOCIETY, ANNUAL EXHIBITION.—The annual exhibition of insects took place on the 21st and 22nd of November, as usual, in the rooms of the Society, Brownlow Street. Although not so large as some of the former Exhibitions there were many interesting insects there. Amongst them was a series of the Lepidopteron recently added to the British list, *Tinea Orientalis* (Stainton), bred from horns by Mr. Simmons, who had also in the same case many beautiful *Cucullia gnaphalii*. Mr. Meek showed eight cases of Lepidoptera from Rannoch, the North and South-west of Ireland, Howth, and the fens of Norfolk and Cambridge, all in beautiful condition. Mr. Weston, a case of Lepidoptera, including *Hydrilla palustris*, *Leucania extranea*, and a curious *Lycæna Adonis*. Mr. Eedle had several educational cases of a highly interesting character, showing the metamorphoses of insects; also a box of fine varieties of well-known Lepidoptera. Mr. Sidney Webb showed a remarkable box of white and silvery forms of British butterflies and moths. Amongst other varieties were a beautifully-marked pale form of *Abraxas grossulariata*, taken by Mr. Priest in Kent (this specimen was the admired above all others in the Exhibition); two *Vanessa cardui*, exhibited by Mr. J. A. Clark; a pair of odd-sided *Smerinthus tiliæ*, by Mr. Pratt; and a curious series of *Abraxas grossulariata* from a second brood, reared by Mr. H. Bartlett. Lepidoptera, as usual, was by far the best represented order; but other orders were exhibited by Messrs. Eedle, Hillman, and Vanderburgh. A large number of visitors were present on each evening.—ED.

THE
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OF

BRITISH ENTOMOLOGY.

EDITED BY JOHN T. CARRINGTON.

WITH THE ASSISTANCE OF

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VOLUME THE TWELFTH.

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—
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"I venture to think the evidence now brought forward, however imperfectly, is at least sufficient to justify the conclusion that there is not a hair or a line, not a spot or a colour, for which there is not a reason,—which has not a purpose or a meaning in the economy of nature."—SIR JOHN LUBBOCK.

"A very tyrant is the rain;
He throweth around his chilly chain,
He barreth the rich, and he barreth the poor,
While his sentinels pace at every door."

T. BUCHANAN READ.

"Roads are wet where'er one wendeth,
And with rain the thistle bendeth,
And the brook cries like a child!
Not a rainbow shines to cheer us;
Ah! the sun comes never near us,
And the heavens look dark and wild."

MARY HOWITT. (*From the German.*)

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[No. 188.]

HYBERNATION OF BRITISH BUTTERFLIES.

By EDWARD A. FITCH.

ABOUT a month ago I received a note from Miss R. M. Sotheby enquiring how *Satyrus Egeria* passed the winter. Not having bred the species, but believing that all our British *Satyridae* hibernated in the larval state, I answered accordingly. However, this was followed by the information that one *S. Egeria* was already a pupa (Entom. xi., 251), and two more have since turned. This, together with the uncertainty regarding that most uncertain species, *Colias Edusa*, led me to consult what authorities I have at hand as to the hibernation of our British species of *Diurni*. The result of the enquiry may, I think, be interesting to many readers of the 'Entomologist,' and the perusal of the list will, I hope, lead to further information. I say this because uncertainty still surrounds the state of hibernation of four of our very commonest butterflies, viz., *Satyrus Megæra*, *Chortobius Pamphilus*, *Polyommatus Phlaeas*, and *Lycæna Alexis*.

Apropos of *C. Edusa*, I may say that, although I have this year 109 acres of clovers, trefoils, and lucerne on my farm, this errant species has altogether failed to put in an appearance, much to my disappointment. What can have become of it?

The hibernation of a species is strictly constant. We know that from locality, climate, or other cause, a species may have one, two, three, or perhaps more broods in the year; still it always passes the winter in the same state. In other cases we may have what may be called premature broods or individuals. By these I mean the abnormally early maturity of some specimens; for instance, a certain larva, even from the same batch of eggs, will occasionally feed away from its brethren, and appear as

an imago in the autumn, while the normal habit of the species is to hybernate in pupa or even in larva, as the case may be. Again, when many individuals pupate together it sometimes happens that some are perfected prematurely in autumn, the rest passing the winter in their penultimate state. Such specimens are, I believe, invariably infertile, and play no part in the continuation of their species. Hence they appear and die, but in no way affect the constancy of the hybernation. Newman treated this subject so clearly that I may be excused for copying his words:—"It is a most interesting fact, and one that cannot be too strongly impressed on the memory, that all the individuals composing one kind, or more properly one 'species' of butterfly, always hybernate in the same state: each adheres strictly to the practice of its species; that is to say, that if one peacock butterfly passes the winter season in the butterfly state, so will its children pass the next winter in the same state, and its children's children the next following winter in the same state, and so on for countless generations." (Brit. But., p. 16).

The following is the list of our British species, with the state in which each passes the winter according to our present knowledge. It will be found to differ considerably from the list in Newman's 'British Butterflies':—

Papilio Machaon. Pupa.	Vanessa Antiopa. Imago.
Leucophasia sinapis. Pupa.	V. Io. Imago.
Pieris cratægi. Larva.	V. Atalanta. Imago.
P. brassicæ. Pupa.	V. cardui. Imago.
P. rapæ. Pupa.	Limenitis Sibylla. Larva.
P. napi. Pupa.	Apatura Iris. Larva.
P. Daplidice. Pupa.	Arge Galathea. Larva.
Anthocharis cardamines. Pupa.	Erebia Epiphron. Larva.
Gonepteryx rhamni. Imago.	E. Medea (Æthiops). Larva.
Colias Edusa. ? Larva.	Satyrus Egeria. ? Larva.
C. Hyale. ? Larva.	S. Megæra. ? Larva.
Argynnis Paphia. Larva.	S. Semele. Larva.
A. Aglaia. Larva.	S. Janira. Larva.
A. Adippe. Larva.	S. Tithonus. Larva.
A. Lathonia. Larva.	S. Hyperanthus. Larva.
A. Euphrosyne. Larva.	Chortobius Davus (Tiphon). Larva.
A. Selene. Larva.	C. Pamphilus. ? Larva.
Melitæa Artemis (Aurinia). Larva.	Thecla rubi. Pupa. (Buckler, Bar-
M. Cinxia. Larva.	rett.)
M. Athalia. Larva.	T. quercus. Egg.
Vanessa C-album. Imago.	T. W-album. Egg.
V. urticæ. Imago.	T. pruni. Egg.
V. Polychloros. Imago.	T. betulæ. Egg.

Polyommatus Hippothoë. ? Larva.	Lycæna Arion. ? Larva.
P. Phlæas. ? Larva (Moncreaff).	Nemeobius Lucina. Pupa.
[Lycæna Bœticus. ? Egg.]	Syrichtus alveolus (Malvæ). Pupa
L. Ægon. Egg.	(Hellins, Zeller).
L. Agestis (Medon). Larva (Zeller).	Thanaos Tages. Larva.
L. Alexis (Icarus). ? Larva.	Hesperia Paniscus (Palæmon).
L. Adonis (Bellargus). Larva. (Hellins).	? Larva.
L. Corydon. Larva.	H. Sylvanus. Larva. (Mühlig, Zeller).
L. Acis (Semiargus). Unknown.	H. comma. ? Larva.
L. Alsus (Minimus). Larva. (Hellins).	H. linea (Thaumas). Larva.
L. Argiolus. Pupa (Buckler).	H. Actæon. Larva. (Buckler, Zeller.)

An analysis of this shows that certainly five species and doubtfully one hibernate in the egg; twenty-eight and doubtfully eleven in the larva; eleven in the pupa; and eight in the imago; whilst the state in which one (*Lycæna Acis*) passes the winter is altogether unknown.

Pieris cratægi departs from the habits of its congeners by hibernating gregariously as a larva.

Colias Edusa and *C. Hyale*.—The information as to hibernation in these two closely allied species is involved. See Entom. xi., 60, 139.

Satyrus Egeria.—In the first record of the life-history of this species Newman says that it hibernates in the penultimate or pupa state, but this is altered (? corrected) in 'British Butterflies,' on what authority or for what reason we are not told. At Entom. iii., 217, we have—"The larvæ are full fed by the end of September. . . . Early in October the larva spins a slight silken covering on a stalk, stem, or blade of grass, and, suspending itself therefrom by the anal claspers, is changed to an obese pupa. . . . In this state it remains throughout the winter, the butterfly appearing on the wing from the 10th to the 20th of the following April." At Brit. But., p. 86, we have—"The caterpillars hibernate early, and are full fed by the end of the following March." From present information the earlier account appears to be correct.

S. Megæra.—Two or three continental authors say this species 'über-wintert' as a pupa. This agrees with the present idea as to its near ally. The genus *Pararge* includes *P. Mæra*, *P. Hiera*, *P. Megæra*, *P. Egeria*, &c. Professor Zeller says that in 1875, in the Albula Pass, he found *P. Hiera* as early as 24th May, and

remarks that the snow was only just then melting, so that the larva must have changed under the snow and the imago have been rapidly developed, or, '*differing from Megæra*,' the penultimate state was reached in the autumn. (Stett. Ent. Zeit. xxxviii., 307).

Chortobius Pamphilus.—Von Prittwitz says this species hibernates in the egg (see E. M. M. vi., 223). Newman says in the larva. Which is correct?

Thecla quercus.—With respect to this species the Rev. J. Hellins very pertinently asks the following (E. M. M. xiv., 112):—"The sallow leaf would before long have fallen from the bush and decayed; and if the larva is not hatched till the spring, what meanwhile becomes of the egg?"

Polyommatus Phlæas.—The only authority I can find for the hibernation of this very common species is Mr. Moncreaff's note at Entom. iii., 41.

Lycæna Agestis (Medon).—Newman says 'egg,' but it is given as 'larva' on Professor Zeller's authority (Isis, 1840 and E. M. M. iv., 74).

L. Alexis (Icarus).—Kaltenbach says this species hibernates, like many of its congeners, as a larva ('Pflanzen-feinde,' p. 109). Newman gives it as doing so in the egg. There ought to be no question about so common a butterfly.

Hesperia comma.—Rev. J. Hellins says (E. M. M. vi., 222) that this species deposits its eggs in August, and they are not hatched till the following March or April.

Maldon, Essex, November 11, 1878.

LIFE-HISTORIES OF SAWFLIES.

Translated from the Dutch of Dr. S. C. SNELLEN VAN VOLLENHOVEN.

By J. W. MAY.

(Continued from vol. xi., p. 247.)

LOPHYRUS VIRENS, Klug.

Klug, *Die Blattwespen in Magazin der Naturforschenden Freunden zu Berlin*, 1816, p. 38.

Hartig, *Blatt und Holzwespen*, p. 119, No. 2, pl. 2, f. 6.

Ratzeburg, *Die Forstinsecten*, D. III., p. 114, Pl. 2, f. 5.

Lophyrus fœm. luteo, viridi et nigro variegatus, alarum stigmatate et costa flavis, tibiarum posteriorum spina latissima;

mas. niger, ventre rufo, clypeo et prothorace supra flavis.
Long 8 mm. Exp. alarum 17 mm.

On the occasion of the annual excursion of the Society, on the 2nd of July, 1871, I took for the first time some larvæ of *Lophyrus virens*, Klug, from which I was fortunate enough to rear the perfect insect.

The larvæ were found for the most part on the ends of the hanging branches on the shady side of an avenue of little pine trees, or, properly speaking, of a rather wide path through a pine wood. It was not till near the end of the excursion that I found the first examples, so that I was only able to take a small number. The pine trees on which the larvæ were found were of the common species, *Pinus sylvestris*; the larvæ occurred at some distance from each other, and not associated in numbers as is usually the case with the *Lophyri*. Judging by the considerable distance at which one larva was found from another (I seldom saw two on one tree), I conclude that the eggs are laid separately. My larvæ were very nearly full-grown, and had but one more moult to undergo. The largest were twenty-eight millimetres long, the colour being grass-green, striped longitudinally with white (see fig. 1). The head is not circular in outline as in the well-known *Lophyrus Pini*, but elliptical (see fig. 2); it is shining pale grass-green, and has a black chevron descending from the vertex to the round black spots in which the eyes are placed; the chevron is thinner at the upper angle than towards the ends of the sides. The labrum and mandibles are brown, the latter with black tips. There is a broad dorsal line along the body of a grass-green colour, somewhat darker at the sides; this line is often a little darker towards the middle also. Next to this, on either side, is a broad sea-green stripe with many transverse folds; next to this a narrow dark green stripe, and then a grass-green one, in which are placed the very small orange-coloured stigmata; this again is bordered by a line of raised folds, quite white, below which are the legs, pale green and twenty-two in number. The horny prolegs have exceedingly fine black longitudinal stripes on the upper side (see fig. 2). According to Hartig certain variations are to be observed in this species as regards the markings on the head. In some examples the chevron above the eyes does not extend to the apex; in others this mark not

only reaches below the round eye-spots, but, in addition, a transverse band is observed between the eyes, crossing the clypeus. Hartig is wrong in saying that the body is entirely smooth, without spines; with a good lens minute spines are distinctly visible.

For the purpose of moulting, my larvæ placed themselves round three or four fir needles, to which the old skin was afterwards attached. I am sorry I had not time to make a drawing shewing the manner of this operation. Immediately after the moult the larva, which was now much shorter and thicker, was of a pale grass-green tint, with the exception of the labrum, which was brown, and also of the black eye-spots. Subsequently the head acquired an olive tint, and the legs, together with the projecting dermal folds above them, were obscure yellowish white (fig. 3).

In somewhat less than a week's time after this moult the larvæ began to make their cocoons, some on the needles of the fir twigs, others against the sides of the box in which they were kept. The cocoon (fig. 4) was reddish white, and had some fine pilose brown wrinkled lines; it was of the usual form of the cocoons of this genus, but appeared to me to be a little more elliptical than that of *Pini*.

With me the imagos appeared in August, which is contrary to Hartig's experience, with whom they only made their appearance in May of the following year; however, on this point he is not very clear. His own words, which seem to me not very explicit, are as follows:—

“Die Verpuppung geschah im Zwinger, in der Mitte des Monat Juli, die Wespen schwärmten in der Mitte Juni des folgenden Jahres also nach beinahe jähriger Larvenruhe. Aus überwinterten Cocons schwärmten die Wespen Mitte Mai.”

The sexes differ greatly from each other; the female is much variegated, the male being of a very sober tint. Fig. 5 represents the female of the natural size; fig. 6 the same sex magnified and with the wings expanded; fig. 7 the male. The sexes are, moreover, distinguished by the antennæ, which in the female are serrate-dentate on the inner side, and in the male are doubly pectinated, having twenty teeth gradually decreasing in length. The following is a description of the two sexes:—*Female*, length 8.9 mm., expanding 17 or 18 mm.; body short and thick, being

broadest at the middle of the abdomen; colours black and yellow or greenish yellow; the head, which is very broad, is greenish yellow, with a broad black transverse band along the forehead and encircling the eyes: this band is unequal and serrate above and below. The antennæ are as long as the head is broad; the first two joints are yellow with the upper border black—these are without teeth; the third joint is yellow at the base, and further black; all the remaining joints are black; the third has a rather long tooth or pectination on the under side; the fourth has a somewhat longer tooth, but the following all gradually decrease in length towards the tip of the antenna. The mandibles are of a brown tint, the palpi yellow. The posterior border of the head, where it touches the thorax, is black.

The prothorax is entirely pure yellow; the mesothorax has the anterior lobe black with a greenish yellow margin; the lateral lobes are black with an obtuse triangle of a yellow tint next to the insertion of the wings. The squamulæ and the scutellum are obscure yellow, with the posterior border black; the metathorax is entirely black. The mesopectus is yellow, with black sutures and a large pectoral spot. The wings are transparent sordid white, with yellow costa, the nervures being partly yellow and partly brown.

The abdomen is essentially green-yellow; the posterior margins of the segments are, however, shining black, broadest toward the middle of the dorsum, so much so that the two anterior segments shew but little yellow at the sides, and only on the fifth does a narrow line of yellow extend across the whole dorsum, while the eighth segment is almost entirely of this colour. On the ventral surface the abdomen displays more yellow, and at the anus is a conspicuous marking of yellow with black spots.

The legs are for the most part yellow, the bases of the coxæ being black, and a line on the under side of the femora, a broad ring at the apex of the tibiæ, and the posterior margin of all the tarsal joints pale brown or grey. In the female as well as in the male the tarsal joints are much expanded on the inner side and are at the same time furnished with patellæ, the inner spine on the posterior tibiæ being, in the female, expanded so as to form a somewhat broad oval plate.

The male is, as a rule, rather smaller, the coloration being black, slightly diversified with yellow; of this colour are the

extreme margin of the clypeus, the labrum, palpi, and the point of the collar. With the exception of the first, all the segments of the abdomen are red at the sides and on the ventral surface, this colour increasing in extent towards the apex. The legs are brownish yellow, the coxæ and apophyses being black; the four anterior femora are black at the bases; the two posterior legs, the bases of the femora, and the apex of the tibiæ are fuscous, and the margins of the tarsal joints brown. The wings have the anterior margin transparent white, not yellow as in the other sex, and the margins of the stigma brown; the nervures are brown or bright yellow. *Lophyrus virens* has been observed in this country (the Netherlands) by M. Six near Utrecht, by M. Brants near Borculo, and by the writer near Breda, and, if I remember rightly, near Brummen also. This species is very scarce with us, and seems to be so in other countries likewise, so that it cannot be considered as one of the insects injurious to the pine.

17, Finsbury Circus, E.C.

NOTES ON CERTAIN SILK-PRODUCING BOMBYCES.

BY ALFRED WAILLY,

Member Lauréat de la Société d'Acclimatation de France.

(Concluded from vol. xi., p. 265.)

SILK-PRODUCING BOMBYCES WITH OPEN COCOONS.

OF these, four species will be mentioned, which have been bred in England, France, and Germany.

Attacus Cynthia; *Attacus Promethea*; *Attacus Cecropia*; *Attacus Atlas*.—These four species in America go under the generic name of *Samia*. *Cecropia* and *Promethea* also go under the generic name of *Hyalophora* in America. The larvæ of these four species all have the same form and appearance, and the imagines the same designs on the wings. The moths can all be taken with the hand and will readily hold to anything—while those of the three species first mentioned, especially *Yama-Mai* cannot be held in the hand; the least touch causes them to drop heavily down, and make half a dozen somersaults before they keep quiet. *Pernyi*, however, is not so wild as *Yama-Mai*. *Attacus Mylitta* (from India), also has the same habits as *Yama-Mai*. *Selene* (from India).—Although belonging to another

genus, has also the habit of dropping down when touched, but it will often adhere to the finger.

Attacus Cynthia (*Samia Cynthia*).—A species acclimatized in France and in the United States of America. Easy to rear in the open air on the ailanthus trees. Will feed also, but not so well, on the laburnum, lilac, and cherry. Double-brooded. Moths will often emerge in the autumn, especially if the rearing of the larvæ has taken place early. *A. Cynthia* is a native of North China; the moths pair as readily as those of *Attacus Pernyi*, and emerge about the end of June.

Attacus Promethea (*Samia Promethea*), from North America.—The cocoon of this species is very similar to that of *Cynthia*, but smaller. The moths do not pair very easily; the larvæ are rather difficult to rear. Perhaps the proper food-plant has not yet been discovered. The larva in England and on the Continent of Europe has been fed on lilac and cherry. In America, it feeds on the *Laurus sassafras* and *Laurus Benzoin*. The male and female moths differ very much in colour, the male being of a velvety black, the female brown.

Attacus Cecropia (*Samia Cecropia*) from North America.—This species is extremely polyphagous, eating almost any kind of foliage: fruit trees, especially plum and apple; also willow (all species), poplar, maple, &c. I received in December, 1877, an extraordinary number of live cocoons of *Cecropia* from America (5500). It has been bred extensively this year in England, France, Belgium, Germany, Austria, and Portugal. I let go from my garden a large quantity of impregnated females, and also took a quantity to a wood near London. Have some of them established themselves in this country? that is the question.

Attacus Atlas (*Samia Atlas*—*Saturnia Atlas*) from India, China, &c.—Food plants: apple, plum, peach, barberry, &c. Of this remarkable species, I could only obtain one brood (pairing), the moths having commenced to emerge only a few days before my leaving London for Paris, at the end of July. The ova I obtained (180) all turned out fertile. Most of the larvæ obtained were bred in France, and some in England. A friend of mine in the country succeeded in rearing all the larvæ (excepting a few, which had escaped) in a hot-house, on the barberry. The larvæ formed their cocoons about a month after their exit from the ova—an extraordinarily short time. I saw the cocoons, which were rather

small, the larvæ very likely having been forced too much. The result of the rearings of *Atlas* in France, which I do not know yet, will be stated in the 'Bulletins de la Société d'Acclimatation de Paris.' I had *Atlas* cocoons of two different races; the ova were obtained from the smaller race, which, I was told, came from Bangalore. Early in 1877, I had obtained a few cocoons of a giant race of *Atlas*, which, with similar cocoons I brought from Paris (empty cocoons), happen to be a race from the Himalaya Mountains. These cocoons did not produce a single moth in the summer of 1877, and some of the pupæ died. But this last summer, in July, I obtained a few moths far more brilliant in colour than the moths obtained from the other cocoons. Two specimens, male and female, are now exhibited, and may be seen in the Insectorium at the Royal Westminster Aquarium, London. The female of this giant race is nearly eleven inches wide from tip to tip of the wings, and is of extreme beauty.

Actias Selene (from India).—This year I succeeded in obtaining four pairs of this magnificent species from cocoons sent from India, June 1st, June 21st, July 4th, and July 5th. I obtained over twelve hundred fertile ova; the first female laid three hundred and fifty ova; the second, two hundred and ninety-six; the third and fourth, about three hundred each. So far as I am aware, the larva of *Actias Selene* was unknown in Europe till I introduced it this year. It has been bred this year in England, France, and Germany. From reports sent by different correspondents I heard that many of the larvæ had died in the last stage. The larvæ which I bred on walnut branches until I left London did remarkably well under one of my large bell-glasses till they were nearly full-grown, none having died, when I had to entrust a friend with the rearing of them. Unfortunately, with twenty-four larvæ, he could only obtain two cocoons, which produced two small male moths in September. *Actias Selene* feeds very well on walnut, and also on willow and cherry. This species is essentially a "*polyvoltine* race," as we say in French, or "many-brooded." The moths began to emerge on the 28th February, and continued to do so till the 8th July, when all the moths had ceased to emerge from the cocoons (thirty-eight in number). This long lapse of time from the appearance of the first moth, on the 28th February, till the appearance of the last two on the 8th July, shows the great

difficulty I had in obtaining ova of this species; and if I had not kept a good number of cocoons, in all probability I should have been unable to obtain fertile ova. Besides the species mentioned, I obtained fertile ova of *Saturnia Pyri*, *S. Spini*, *S. Carpini*; also *Aglia Tau*, and others; but of these latter I only bred a few *Aglia Tau*.

110, Clapham Road, London, S.W., Nov. 12, 1878.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

BY W. F. KIRBY,

Assistant-Naturalist in the Dublin Museum of Science and Art.

NO. XI. NYMPHALIDÆ—NYMPHALINÆ.

Insects allied to VANESSA (concluded) and to ERGOLIS.

OUR next genus is *Kallima*, one of the most remarkable of the *Nymphalidæ*, from the extraordinary resemblance of the under surface of the insect to a dead leaf. The Indian species are nearly four inches in expanse, bluish or purplish above, with a small transparent spot in the middle of the fore wings, beyond which a broad orange band (in *K. Paralekta* and *Inachis*) or a bluish white band (in *K. Philarchus*) runs obliquely from the middle of the costa nearly to the hinder angle. The fore wings are more or less pointed, and the anal angle of the hind wings is produced into a short tail. The under surface is brown, with a dark streak resembling a midrib running from the tip of the fore wings to the tail of the hind wings. The butterfly sits with its wings over its back, its head and antennæ raised and hidden; and the tails, resting on the branch, which represent the stalk of the leaf. Irregular streaks and mottlings render the resemblance still more perfect; and we can readily believe Mr. Wallace (whose description and figures in his book on the Malay Archipelago may be consulted with advantage), when he says that the butterfly cannot be detected when at rest, from its resemblance to a dead leaf. The African species, *K. Rumia*, is smaller, with the tip and anal angle less produced, nor does the under side (which is marked with two small eyes on the hind wings, as in the following genus) present so close a resemblance to a dead leaf. The upper side is brown; the male with a broad oblique pinkish band on the fore wings, and a shorter orange stripe nearer the tip. The female

is brown, with a narrower and shorter oblique white or buff band on the fore wings, and some white spots beyond; and with a broad buff band on the outer half of the hind wings, marked towards the anal angle with a black eye with a white pupil.

The East Indian species of *Doleschallia* expand about three inches, and are heavy-looking fulvous butterflies, either with broad black borders (*D. Australis*) or with the tip broadly black, and marked with a short oblique fulvous stripe, sometimes followed by a spot (*D. Bisaltide* and *Polibete*). The under side is varied with different shades of reddish brown, and a dark leaf-stalk shade resembling that of *Kallima* runs from the middle of the costa of the fore wings to the short tail on the hind wings. Outside this, on the hind wings, are two dark eyes with black and blue pupils and yellow rings, which are sometimes represented by black dots above; towards the inner margin of the fore wings are some indistinct eyes. The African *D. Cymodoce* is brown, blue at the base, with a large eye near the anal angle of the hind wings both above and below. The little *D. Eurodoce*, from Madagascar, more resembles a species of *Precis* in size and colour, though in shape it agrees with the other species of *Doleschallia*, except that the tip of the fore wings is rather more hooked and the tail of the hind wings longer. It is dark brown, with a curved fulvous band on the fore wings running from the costa beyond the cell to the inner margin, a little before the anal angle; the outer third of the hind wings is fulvous, with two dark submarginal waved lines. The under side is brown, varied with tawny; the space beyond the dark midrib (which is much lighter on the hind wings) is marked by a row of inconspicuous white dots, evidently representing a row of eyes.

The next genus, *Anartia*, contains four South American species closely resembling *Vanessa* in appearance and habits. They generally expand about two inches, and the wings are slightly dentated and angulated, and the hind wings have a slight projection at the outer angle, which makes them appear more or less square. *A. Jatrophæ* is buff, with more or less conspicuous brown lines, and is more or less suffused with brown towards the base, and with brown and yellowish towards the margins. *A. Amalthea* is dark brown, with a broad scarlet band on all the wings, commencing with two broken stripes in the cell of the fore wings. There is an oblique band of connected white spots beyond

the cell on the fore wings, and some smaller spots nearer the tip; and a submarginal row of white spots, gradually shading into red ones, on the hind wings. These species are both abundant throughout tropical America; the others are more local and rarer. *A. Fatima*, from Central America, has a yellow band of moderate width running from the middle of the costa of the fore wings to the middle of the hind wings, where it ceases suddenly, though it is followed by a detached yellow spot. Within it is a row of about four red spots on the hind wings, and there are some yellow spots towards the tip of the fore wings. *A. Lytræa*, from the West Indies, is brown, with an indented dull orange marginal line, and an eye with a black pupil in a dull orange ring at the anal angle of all the wings, above which is a white stripe, divided by the nervures, and broader on the hind wings than on the fore wings, running from the costa.

The genus *Eurytela* is of moderate size, the species expanding less than two inches. The wings are rather broad, and the hind margin of the fore wings is generally more or less excavated below the tip; the hind wings are rounded and scalloped. The few species are either African or Malayan, and are generally dark-coloured. *E. Dryope* has a broad submarginal orange band, running from the inner margin of the hind wings, towards the tip of the fore wings, before reaching which it narrows and disappears. *E. Hiarbas* has a similar but narrower white band, which is much farther from the hind margin, especially on the hind wings. Several other African species have a broad white band on the hind wings, and another, interrupted and broken into spots, on the fore wings, which gives them considerable resemblance to some species of *Neptis*, for which genus they might easily be mistaken. One of the Malayan species, *E. Castelnavi*, is of a brilliant blue above.

The genus *Ergolis* is closely allied to this, and is nearly of the same size and shape, but the fore wings are broader and shorter. All the species have a conspicuous white spot on the costa near the tip, but sometimes only on the under side. The African *E. Enotrea* is brown, with many indistinct zigzag transverse lines, and with the whole centre of the hind wings and a great part of the fore wings beyond the cell crossed by a broad but very ill-defined bluish grey band. *E. Ariadne*, a common but very variable East Indian species, is dull tawny above, crossed by many

zigzag brown lines; *E. Tæniata*, from the Philippines, is reddish brown, with a submarginal orange band, and *E. Obscura* from Gilolo, which expands over two inches, and is the largest of the genus, is brown above, with one zigzag dark line on the middle of the fore wings, and two on the hind wings. The under side of the hind wings of most species of *Ergolis* is rich brown, with more or less distinct darker bands.

Hypanis Ilithyia is a handsome black and orange butterfly, common in Africa and the East Indies; it expands about one inch and a half. A broad orange band runs from the inner margin of the hind wings to the costa of the fore wings, but is broadly interrupted nearly opposite to the end of the cell, which is partly filled up, and bordered below by a broad orange basal stripe, deeply indented above and below, and connected with the central band; there is also a row of submarginal orange lunules. The under side of the hind wings somewhat resembles that of a *Melitæa*. They are banded with different shades of orange, yellow, buff, or whitish; towards the base the bands are edged by rows of black spots, but beyond the middle they are edged by black lines, and the nervures being also black on the outer half, the pale bands are broken into spots. The arrangement and width of the bands of the under surface, and the extent of the orange markings on the upper surface differ considerably, and it is not at all improbable that some of the supposed varieties (several of which have received names) may be really distinct species.

NOTES ON HYMENOPTERA.

BY EDWARD CAPRON, M.D.

IN the November 'Entomologist' for 1878 (Entom. xi. 242), I recorded a new *Crabro*. I now am able from the examination of my summer captures in this neighbourhood to announce two interesting additions to our native Ichneumonidæ, of which I append descriptions:—

Phygadeuon digitatus, Grav. (fem.).—Long. $3\frac{1}{2}$ lines; alæ expans., 6 lines. Black; mandibles red in middle. Antennæ with joints 8—13, white. Legs red, with coxæ and trochanters black; posterior tarsi, and apex of posterior tibiæ rather darker. Seventh segment of abdomen with a whitish membranous patch.

Aculeus rather longer than half the length of abdomen. Hab. Shere, Surrey.

Stibeutes Heinemanni, Först.—Long. $1\frac{1}{2}$ lines (fem.). Black; antennæ with joints 2—5 and sometimes 1 also reddish yellow. Wings longer than metathorax with distinct stigma; legs reddish yellow. Abdomen nut-brown, with apical segments darker. Aculeus as long as first segment of abdomen, which latter has no lateral projecting tubercles. Hab. Shere, Surrey.

The former conspicuous insect cannot be mistaken for any of its allies. The latter was kindly identified for me by Mr. J. B. Bridgman of Norwich, from Förster's monograph of the *Pezomachi*.

Though I believe a very indifferent season for Entomology generally, the last summer afforded me, as well as the three new species above mentioned, several that are not usually met with among the Ichneumons, Bracons, and Oxyura, and is a proof how much remains to be done among these much-neglected and extensive families.

Chiefly among the larger species I may note the occurrence of *Ichneumon bipunctorius*, Steph. This handsome insect, I believe, exists in few cabinets, and does not appear to be known among foreign authors. I also obtained two specimens of *Clistopyga incitator*, and one of the singular *Foenus jaculator* (*Evaniidæ*), which I took on the flowers of *Pastinaca*.

In the OXYURA group the *Diapriidæ* gave me *Galesus clypeatus*, *Aneurhyncus ruficornis* and *galesiformis*, and numerous species of *Paramesius* and *Diapria*. The *Proctotrypidæ* afforded me eleven species, and I obtained examples of *Perisemus triareolatus* and *Goniozus claripennis* among the *Bethylidæ*. I believe the late Mr. F. Walker had never met with the latter species. I think British Entomology would benefit considerably if a little more attention was paid to these most beautiful and abundant insects, and that our catalogue of Hymenoptera would be rapidly increased. In some future paper I purpose to offer a few remarks on killing and setting the smaller species satisfactorily, which at first seems difficult and deterring to the beginner. Another difficulty no doubt exists in the want of suitable works, but besides those recently mentioned by Mr. E. A. Fitch, the excellent monographs of Holmgren's can now be obtained at a reasonable cost from several booksellers, and, by communication

with others who are already conversant with the leading types, sufficient knowledge is soon gained to enable anyone to associate together the allied genera and species.

Shere, Surrey, December 2, 1878.

ENTOMOLOGICAL NOTES, CAPTURES, &c

NEW BRITISH SPECIES IN THE PHYCIDÆ.—I have much pleasure in recording the capture of a new British *Euzophera*, which I identified, by examination of the foreign collection in the British Museum, as *Euzophera oblitella* of Zeller. The following is a description of the one I captured:—Front wings greyish, dusted with darker, both lines black, the first preceded, the second followed, by a pale band; nearly midway between the two, is a conspicuous black spot; near the base, and almost touching the costa, is another black spot; hind wings pearly grey, gradually darkening to the hind margin. The specimen is in beautiful condition, and was taken on the south-west coast of the Isle of Wight in the autumn of 1876. I have not identified it until lately. There is only one specimen in the British Museum collection. In Staudinger's Catalogue, Germany, Hungary, South-East Russia, Mid-France, Andalusia, and Sicily, are recorded as localities.—J. B. BLACKBURN, B.A.; care of Rev. J. Buckmaster, The Vicarage, Wandsworth, November 19, 1878.

ELACHISTA MONTICOLELLA, A SPECIES NEW TO BRITAIN.—When at Witherslack in August, 1872, I took several specimens of an *Elachista* that I thought distinct from *E. Kilmunella*. I sent them to Mr. Stainton, along with my series of *E. Kilmunella*, and called his attention to them. He replied, "Get more; try and find the larva; I think you have a good new species." A short time ago I sent some specimens of the same moth, and he returned them named as above, coupled with the remark, "It is probably Edelston's '*Alpinella*.'" Very oddly, when Mr. Sang was staying with me this summer, these specimens were overhauled, and he, Mr. Sang, said he had found an *Elachista* larva he did not know, which when bred proved to be this species; and simultaneously with this information came word from Mr. Warren that he had also turned up the same species.—J. B. HODGKINSON; 15, Spring Bank, Preston, December 11, 1878.

ABSENCE OF *Colias Edusa* IN IRELAND IN 1878.—I have not seen a single clouded yellow this year, although I have hunted for it at Greystones and Bray Head (one of its favourite resorts), co. Wicklow, at Howth near Dublin, and at Glengarriff and Queenstown, co. Cork. If this has been the case with regard to *Colias Edusa*, the contrary may be said of *Vanessa cardui*, which as far as my experience goes was the commonest butterfly this summer. I counted over thirty specimens of her ladyship in a clover field at Bray Head. From accounts published, *Acherontia Atropos* seems to have been taken this year in tolerable abundance. In addition to the one chronicled by me (Entom. xi. 160) I know of three others which were caught respectively at Schull, about August 25th; near Glengarriff, October 4th; and at Bantry, early in the same month.—WILLIAM W. FLEMING; 18, Upper Fitzwilliam Street, Dublin; November 8, 1878.

NOTES FROM GUERNSEY.—The following species must be added to the list of Guernsey Macro-Lepidoptera:—*Deiopeia pulchella*: a fine specimen was captured on the coast near Petit Bo Bay, by Mr. Frederick Heume, and I have had the pleasure of seeing it in his collection. *Leucania straminea*: I took two on July 10th, on a marshy piece of ground, called the Grande Mare, near Vazon Bay. *Aporophyla australis*: I bred two rather small specimens from larvæ found during spring on the sandy north coast of the island. The imagos emerged on September 29th and 30th. *Hecatera serena*: I found one at rest on a wall, whilst searching for *Bryophila glandifera*. Lepidoptera, generally, have not been nearly so plentiful this season as last, and sugaring, although repeatedly tried under seemingly favourable circumstances, has been of very little use. In places where *Lithosia rubricollis* was abundant in former years, I have only found two or three specimens, and I have not succeeded in finding a single larva. *Colias Edusa*, which was so plentiful here last season, has been scarcer than usual; and I have only been able to find one *Eubolia peribolata* instead of the usual one or two dozen.—W. A. LUFF; Guernsey, November 15, 1878.

DESCRIPTION OF THE LARVA OF *SPILODES PALEALIS*.—The larvæ from which the following description was taken were sent to me the last week in August 1876, by the Rev. P. H. Jennings, M.A., of Longfield Rectory, Gravesend. He had found them in

that district feeding on the umbels and flowers of *Daucus Carota*. Length when at rest about three-quarters of an inch, when crawling about an inch. Body stout and cylindrical, the segmental divisions well marked; head polished, the lobes globular, and there is a plate of the same polished appearance on the second segment; the skin has a soft appearance and is sparingly clothed with short hairs. Ground colour of the dorsal surface dull dingy green; head and plate yellowish green, conspicuously marbled with intense black; dorsal stripe dark green, broad except at the segmental divisions; tubercles raised, large and brightly polished, intense black encircled with yellow; spiracular region yellow—on its upper edge is a row of black tubercles, similar to, but smaller than those on the dorsal region; spiracles very small but distinct, also black. Ventral surface yellowish white, legs and tubercles intense black; prolegs also tipped with black on the outside. One larva had the ground colour of the dorsal surface purple, the dorsal stripe darker purple, and the black tubercles encircled with pinkish; the spiracular region also pinkish.—GEO. T. PORRITT; Highroyd House, Huddersfield, November 7, 1878.

CAPTURES NEAR MORPETH.—*Deilephila livornica*: On August 5th of this year, I received a living specimen of *D. livornica* from Mr. Schofield, Secretary to the Morpeth Mechanics' Institution Field Club. The insect was taken near Hartburn, at rest on a fence, about three o'clock in the afternoon on the above date, and it appears to have been a considerable time on the wing, for the colour is faded and the wings are a little worn. I also got from Mr. Schofield on September 17th, a larva of *Acherontia Atropos*, but unfortunately it died. I heard that several more were destroyed in the neighbourhood of Morpeth through the ignorance of the people who found them. In 1877 *Colias Edusa* was generally diffused over this neighbourhood, but not abundant; the first insect that I saw was on June 4th, and I took a very fine *Helice* on the 7th. All the *Edusa* that were seen from June 4th up to the first week in July were females; no more were seen from the first week in July until September 2nd, when male and female appeared in about equal numbers, and continued on the wing until the second week in October. I have not seen or heard of any one who has seen a single specimen of *C. Edusa* this year.

I have a specimen of *Vanessa Antiopa* which was taken in this neighbourhood on August 20th, 1876.—JOHN FINLAY; Meldon Park Gardens, Morpeth, November 13, 1878.

CAPTURES NEAR HARTLEPOOL.—*Deilephila livornica*: a specimen of this insect was brought me in July by a lad, who caught it on the town moor. It is rubbed by being carried in his hands, but had evidently been very fine when obtained. The only other occurrence of this rarity in this district that I know of, is a specimen recorded in 1858 by Mr. E. Backhouse as being taken at Sunderland "many years ago." *Sphinx convolvuli*: a fine specimen of this insect was picked up on the sands near Seaton Carew, in October. Yellow varieties of *Zygæna filipendulæ*; three specimens of this variety have been obtained here this summer. Beginners, to whom the commonest species are desiderata, have best success with such as these. One of these was bred and another taken by a beginner, the third was taken by a lad and given to me.—JOHN E. ROBSON; Bellerby Terrace, Hartlepool, West.

LEUCANIA EXTRANEA IN CORNWALL.—On looking over a few insects taken by a schoolboy friend, I noticed a specimen of this rarity. On enquiry, I learnt that he had been spending a week in Cornwall, during August last, and that this insect had been taken from a sugared thistle-head. He also captured several common species of *Noctua* from the same heads, which he found very attractive. The specimen, which is a female and rather worn, is now in my collection.—WALTER P. WESTON; 1, Duncan Terrace, N., November, 1878.

HYDRILLA PALUSTRIS.—I have succeeded in adding to my collection a specimen of this rarity, which was captured at Wicken Fen this year, where I am informed several others were taken.—ID.

ANCHOCELIS LUNOSA HYBERNATES AS A LARVA.—There appears to be some confusion as to how the four species of *Anchocelis* hibernate. The eggs of *A. rufina* are said to hatch in the spring (Bryant, Entom. vi. 127), as also are those of *A. pistacina* (Crewe, Zool. 6384). The Rev. P. H. Jennings has recorded (Entom. vii. 287) that the larvæ of *A. litura* emerged the first week in October from eggs laid on September 23rd, while Mr. Buckler in his life

history of this species (E. M. M. ix. 39) states that the eggs laid early in October did not hatch till the middle of April. This autumn a female *A. lunosa* laid me a quantity of eggs on September 21st; these hatched on October 18th, and the larvæ are now doing fairly well on grass.—EDWARD A. FITCH; Maldon, Essex, November 19, 1878.

IDENTITY OF *EPHIPPIPHORA* *OBSCURANA* (Steph.) AND *E. GALLICOLANA* (Zell.)—Upon reading my former article on the identity of these species, I noticed one or two inaccuracies had crept in, which I take this opportunity of correcting. Thus "costal blotch" should be read "dorsal blotch," and in the nomenclature, Professor Zeller's name *E. Gallicolana* should be sunk as a synonym of *Obscurana*, Steph., which must be adopted for this species. The galls from which the majority of mine were bred were the round hard galls of *Cynips Kollari* (Devonshire gall), and only one specimen emerged from the galls of *Andricus terminalis* (the well known oak-apple). I have also submitted a series of my bred examples to Mr. C. G. Barrett, showing how very variable the species is, and I am happy to say he entirely agrees with my opinion as to the identity of these species; indeed he writes "No other conclusion could reasonably be arrived at, for the variations in the pale portion of the hind wings, in the shape and colouring of the fore wings, and in the form of the dorsal blotch, cover the whole range of the supposed distribution between the species."—W. P. WESTON; 1, Duncan Terrace, Islington.

AUTUMN PUPATION OF *ABRAXAS GROSSULARIATA*.—In November last year, I noticed on some old gooseberry and currant bushes what I first thought to be some old pupæ of *A. grossulariata*, but on pulling one or two off was surprised to find them alive and fresh. I collected about seven dozen and tried to rear the imagos, but failed, as the frost killed those I kept outdoors, and those I kept in dried up. This year, in October, I was in the same garden, and in two days I collected about forty dozen, and saw the larvæ in all sizes, from a quarter of an inch in length to some spinning up. I also found several pupæ which had only just changed, as they were yellowish in colour and quite soft.—H. SILCOCK; 22, Randolph Street, Camden Town, N. W., November 11, 1878.

GNORMIUS VARIABILIS.—Two specimens of this beetle were

taken at Tooting Common in a decaying oak, last summer.—N. C. GRAHAM; Tulse Hill.

HUMMING OF *ACILIUS SULCATUS* AND *COLYMBETES FUSCUS*.—Whilst *Acilius sulcatus* is humming it slightly raises the elytra and protrudes the tip of the abdomen; the tips of the wings are also often slightly advanced beyond the elytra. The sound is, I am convinced, produced by very rapid vibration of the wings under the elytra, for the tips of the wings may be seen in very rapid motion up and down, and the extremity of the body often appears slightly greyish from this vibration. If also the elytra, the prothorax, the head, or the tip of the abdomen, be touched with the point of a fine needle, the vibration may be very distinctly felt; and if this is carefully done the beetle will not discontinue its humming. The sound produced changes in its tone just previous to its ceasing, as it does immediately the beetle extends its wings for flight. During the humming the maxillary palpi are moved with a twitching motion, and the antennæ are vibrated. These organs have, however, nothing to do with the noise produced, as they may be touched and stopped with the needle without causing any alteration in the sound. The male of *Colymbetes fuscus* I find hums in a similar manner, but not so frequently as *Acilius sulcatus*. Both males and females of *A. sulcatus* produce a similar sound.—A. G. LAKER; Court Hill Road, Lewisham, November 6, 1878.

OBSERVATIONS ON *ACRIDA VIRIDISSIMA*.—By a perusal of my friend Mr. Tenant's paper on *Acrida viridissima* (Entom. xi. 183) and Mr. Hodge's subsequent notes on the same insect (Entom. xi. 274), I have been induced to add thereto those of my own, which possibly may be interesting, and as this fine species is very local it may not be so well known to many. A short distance from this city (Norwich) there appears to be quite a colony of these insects, which seem to confine themselves to a radius of a mile or more, where I have for several years past been entertained by their nocturnal concerts in my "mothing" expeditions. The males commence their stridulations just before sundown, which extend far into the night, and the performance of several of these insects in close proximity is almost deafening: the male only "sings," but I suspect the female of uttering a faint chirp, but of this I am by no means certain. The male generally takes

up his position on the topmost twig in the hedgerow—often on an ear of corn,—which position he will maintain during the whole of the evening, and will there “rasp” away unceasingly for hours, if not disturbed; he will often be found performing on or near the same twig the next evening. Three years ago I turned out a male of this insect in my garden, who perched himself on the topmost branch of a tall larch tree, where he carried on his harsh evensong for more than a week, when I missed him, and never heard him afterwards. These insects seem to be gifted with a species of ventriloquism, for it is often extremely difficult to mark the spot whence the “singing” appears to proceed, one’s sense of hearing seems to be entirely baffled by them; sometimes you fancy the noise on the right—now it seems to come from quite an opposite direction; to get a sight of the singer is not always an easy matter—the moment he hears a footfall his song ceases until all is silent again, when, feeling convinced that all danger is past, he again goes at it as vigorously as ever. I have found the best way of capturing this insect—supposing he can be seen—is to get behind him if possible, approaching him very cautiously, for he is a wary fellow, and taking him by the long legs or “hoppers,” if I may so term them; if not careful he is capable of inflicting a sharp bite, which I know by experience; in this way I have often captured from three to six of them in an evening. In confinement these grasshoppers will sing as vigorously as if in their native haunts; they are omnivorous; I have frequently observed them devouring blades of grass and other vegetable matter, which, however, seems to constitute their most natural food; they are also fond of sugar, and small house-flies they are particularly partial to; if one of these be put into the cage, it often remains unnoticed for some time, until it happens to approach the grasshopper, when it is suddenly seized and devoured. *Acrida viridissima* is a confirmed cannibal. I have had at least one proof of its depraved appetite, for, two or three years back, I had two in confinement for some time, but on looking into the cage one morning I observed one of them coolly “breakfasting” on the dead body of his companion, lately “departed.” These insects will quickly bite their way through muslin or leno, and should be confined in a cage covered with perforated zinc, which I have found the best material to keep them “at home.” The constant habit of licking the tarsi

referred to by Mr. Tenant (Entom. xi. 183), appears to be the chief employment of these insects during the daytime. August is the month when this species makes its appearance, and its song may be heard thence away to the latter end of September.

“He is an evening reveller, who makes
His life an infancy and sings his fill.”

—R. LADDIMAN; Upper Helledon, Norwich, December 16, 1878.

OAK-LEAF HAIRY GALLS (*SPATHEGASTER TRICOLOR*).— On May 25th last I found these galls in considerable numbers at Shanklin, Isle of Wight, on low-cut hedge oaks. They were apparently full grown, three-tenths of an inch or so in diameter, and, as yet, unperforated. Five days later the first *Spathegaster* appeared. On the morning of May 30th I passed, on my way from Brading Harbour to White Cliff Bay, through Centurion's Copse, which contained many pollard and cut oaks. On them I found these galls in such numbers as I had never before seen. The leaves in many instances were literally loaded with them, thicker than currant galls often are. Next day, on an excursion from Shanklin to Apse Castle, I again found these galls in great profusion, always on cut oaks. Throughout the island the hedgerows, as in Devonshire, are frequently planted in high banks, and have numerous small oak-trees growing along them. The roots of these strike through the bank and throw out shoots which, being cut year after year, become thick and bushy. On these the galls are found in astonishing numbers. They are usually met with on the under surface of the leaf, though at times they appear on the edge, or, at least, the leaf has so curled round during their growth as to expose them to the sun and light. When this is so they show, as in the case of many other galls, bright crimson, more or less diffused according to exposure. When much shaded (and it seems to be the habit of the parent insect to oviposit in situations where this, as a rule, occurs) the galls are almost snowy white, and are then thickly beset with hairs. As they grow older, and especially when much exposed, these hairs dry up, and in very many instances the galls are found perfectly glabrous. In all cases they present a beautifully waxy appearance, often resembling a delicate green, or green and red, miniature peach. They are frequently so aggregated as to make compact clusters, and coalesce to form double and treble galls. Sometimes even as many as six or eight will be fused together in

this way. Occasionally some galls are found which are clearly distinguishable in appearance from the rest. These are comparatively small—one-tenth of an inch or less in diameter. They distort the leaf more, are less waxy in appearance, and yellower in colour. When pressed they are firm and hard; when cut, woody and nut-like. These contain inquiline larvæ, two, three, or more in a single gall. The first imago of these (*Synergus albipes*) emerged on June 23rd. Other galls, normal in appearance, had been already attacked by parasites, the larvæ of which, as early as the end of May, were found actively feeding upon the juices of their hosts. By June 24th they had passed through their several metamorphoses and emerged from the galls. Mr. Fitch has been kind enough to determine the species, which comprise *Callimome auratus* (male and female), two kinds of *Pteromalidæ*, and one *Eurytoma*; all common in these and allied galls. As with other organisms, galls have their favourable and unfavourable years, and last season seems to have produced *Spathegaster tricolor* in exceptional numbers. In my own neighbourhood, where, as a rule, this gall is but sparsely met with, it has been this year found in comparative abundance both by Dr. Ransom and myself.—G. B. ROTHERA; Nottingham, Nov. 18, 1878.

A BETHYLID (OXYURA) BRED FROM GALL OF ANDRICUS TERMINALIS.—I have just received from Mr. G. B. Rothera a specimen of the common *Perisemus triareolatus* Först (= *Bethylus fulvicornis*, Curt.) which emerged on April 14th last from an old oak-apple of *A. terminalis* collected in the previous December.—EDWARD A. FITCH; Maldon, Essex, November 19, 1878.

HEDYCHRUM BRED FROM CYNIPS KOLLARI GALL.—Dr. Capron informs me that in May, 1877, he bred *Hedychrum* (*Homalus*) *auratum* from these galls. I have never met with it as a gall-inhabitor, but Westwood says “M. le Comte de Saint Fargeau states that the females of *Hedychrum* sometimes deposit their eggs in galls” (Introduction to Mod. Class. Insects, ii. 178) and both Kollar and Giraud obtained this species from bramble galls (Verh. z.-b. Gesell, Wien. xiii. 1288) where it was parasitic on *Cemonus unicolor*. In the instance now mentioned, whether the gall had previously been taken possession of by an *Osmia*, or whether the Ruby-tail was parasitic on some legitimate inhabitant, does not appear.—ID.



ATTACUS ATLAS.

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ATTACUS ATLAS: A LIFE-HISTORY.

BY PHILIP HENRY GOSSE, F.R.S.

THE Great Atlas Moth of farther Asia, the vastest of all known Lepidoptera, has always, with me,—at least since I began to collect and study Insects, now more than six and forty years ago,—been invested with a halo of romance; and to rear it through its various stages,—egg, caterpillar, pupa, imago,—this seemed too grand a vision to come within the range of hope, if hope is truly defined as desire with expectation. There was the desire, indeed, but the expectation was *nil*.

When I returned to England from America, in 1839, I saw, hawked about in the streets of London, (what doubtless my readers have often seen, for it is common enough, as I afterwards found),—a case of Chinese insects. A box, lacquered, and gilded, and glazed, crammed as full as it could hold, with insects of all Orders, and in the midst a noble *Attacus Atlas*, in perfect condition, a female stretching more than nine inches in expanse of wing, of the variety γ of the Brit. Mus. Catal. p. 1219. That very specimen I still possess. I bought the whole case, threw away the herd of plebeian beetles and bugs, retaining only a few of the finer *Papilionidæ* as satellites to *Atlas*, re-papered and re-furbished the box, making it hermetically tight, with such success that the lapse of forty years has not produced the slightest trace of mite-dust on the paper beneath the heavy-bodied Moth. Barring a little fading of the rich red and brown hues, the specimen is as perfect as it was then.

I do not mean to represent the acquisition of this example as any special achievement in science; it was but to myself the first incident in the history which I come to narrate. Even then the

species was common enough in all museums and private collections. It had been described by Linnæus, Fabricius, and Gmelin; pictured by Petiver, Seba, Valentin, Knorr, Merian, Cramer, Olivier, Hübner, and others;—so that no exotic insect was better known than “Le Géant des Papillons.” It is, too, a wide-spread species, ranging over the south and east half of Asia, continental and insular;—common on the slopes of the Himalayas, and all through India to the points of both peninsulas; abundant in China, as I have already intimated; scattered over the isles of the Archipelago, from Java to the Moluccas, to Borneo and the Philippines:—a range of 35° of latitude, and 55° of longitude.

As is often the case with animals of extensive habitat, this magnificent Insect is subject to considerable variety. The variations range in two groups, according as the curious windows in the wings are single, or accompanied by small side-windows. The possession of these glassy areas, of definite forms, and usually set in dark frames, is highly characteristic of the *Saturniadae*, the noblest family of the Moths; in some, indeed, reduced to little more than a mere slit of glassy membrane, as in our English Emperor Moth (*Saturnia carpini*), the only native example of the family; but in many taking large dimensions, and remarkable forms, whence these Moths are called by the French *Porte-miroirs*. Few have these windows more conspicuous* than the grand species before us.

Common as *Attacus Atlas* has been in all the museums of Europe for more than a century, our familiarity with it has been limited to its adult, imago condition: we have known it very well as a Moth; but, in other respects, not at all. What were the earlier stages of this noble insect? That the caterpillar would be *generally* like that of our own Emperor, we might confidently conjecture from analogy; that it would spin a cocoon of silk in which it would pass its pupa-life, there could be no doubt; but the dimensions, colours, and forms, of these, in detail, no one knew, in Europe at least. Some light irradiated the subject,

* In two species figured and described by Mr. Westwood in Proc. Zool. Soc. Lond. for 1849 and 1853,—*Attac. Mythimnia* of Port Natal, and *Att. Zacateca* of Bogota, the fenestræ are larger in proportion than in *Atlas*, though the insects themselves are much smaller; the latter of the two being indeed a tiny *Attacus*, though most elegant in form and rich in colour.

about twenty years ago; when Dr. T. Horsfield and Mr. F. Moore published two vols. of "A Catalogue of the Lepid. Ins. in the Mus. of the E. Ind. Comp." In the second vol. of that fine work, a full synonymy of the species is given; a description of its transformations by Lady Isabella Gilbert; and a note of its habits in Java. Lady I. Gilbert, in N. India, writes (1825):—

"A specimen (female) was caught on the 4th of September. On the following morning she laid several pink-and-white eggs. On the 15th the young caterpillars were hatched. Being uncertain what plant they fed on, I placed them on slips of different trees, viz., apple, plum, peach, &c. The young caterpillars were black, with numerous white spines; as they grew larger, and changed their skins, the spines became covered with a kind of white powder, giving them a very delicate appearance; added to which, the ground-colour of the body, since the first few days after they were hatched, had become a light green. They always ate their skins after casting them. Day and night they devoured the leaves, and those on the apple-branch grew to an enormous size: on the 12th of October one of these began to prepare for its transformation by bending back a large leaf, and inclosing itself in a web, which it completed on the 13th. During the three preceding days it had considerably diminished in size: this I have observed to be the case with many larvæ prior to their change. On the 22nd of June following the moth came out."

To this the authors have added:—"Feeds on the Melokka (*Phyllanthus emblica*), Kupu-gaja, &c. December to January. Rather common. (Horsfield MS.)" The full-grown larva and the cocoon are figured from the last-named authority.

In a valuable "Synopsis of the known Asiatic species of Silk-producing Moths," (Proc. Zool. Soc. for 1859), Mr. Moore has, of course, included *Att. Atlas* (p. 265). The account in the "Catalogue" is repeated verbatim, with the following additional note. "It is said that the Chinese Tusseh silk is obtained from the cocoon of this species."

Mr. F. Walker (List of Lep. Ins. in B. Mus. Part V.—1855) gives, besides a copious synonymy, a diagnosis of eight varieties of the imago; but not a hint of the early stages.

The mortality which has, during the last quarter of a century, fallen on the cultivated Silkworm, not in Europe only but also throughout Asia, has caused an anxious search in various countries for other silk-spinning species, and the introduction of several of these into Western Europe; in hope that some might

prove available substitutes for the long established *Bombyx mori*; or, at least, valuable aids to it. The success of these endeavours it is not my present business to exhibit; they have certainly not been wholly futile; suffice it to observe, that among these importations the cocoons of the glorious *Atlas* have at last gladdened our occidental eyes.

In March 1868 M. Braine, of Arras in France, received thirty cocoons of *Atlas* from that learned entomologist Captain Thomas Hutton of Mussooree, whose researches on the debilitated condition of the old Silkworms, and suggestions for their renovation, are well known (Trans. Ent. Soc. 1864, 1865). M. Braine has given us* a brief relation of his success in rearing the species. The cocoons being kept dry, in July evolved the moths, seven and a half to nine and three-quarter inches in expanse. Through the irregularity of their emergence, coupling was accomplished with difficulty, and only a few (fifty or sixty) ova were produced, which were of a rose-colour, and not quite so large as those of *Yama-mai*. These he wintered in a warm room; and the larvæ were hatched about the end of the following June (1869). He fed them on the common pink barberry, in the open air, exposed to the sun. Many of them died at the third moult; more still at the fourth. At last, however, a few went into cocoon, towards the end of August; these were exhibited to the public at the Exposition des Insectes (Oct. 1872). This time the marriages of his pets were much more normal, and he obtained a considerable number of eggs, and some "very remarkable" moths. He hoped now to prosecute his culture on a large scale. But the war in 1870 blasted his hopes, wasted his plantations, and just permitted him, with difficulty, the means of recommencing. Having replanted his barberries, and nursed his protégés, M. Braine obtained in 1872 a full success, and exhibited satisfactory results at the Exposition of Luxemburg.

"I think I may say," concludes the enterprising naturalist, "that I have acclimated this magnificent species of Bombycidae, of which each cocoon weighs, on an average, two grammes [or $\frac{1}{4}$ th of an ounce]."

"The *Attacus Atlas* is very inert and somnolent: when once it is attached to the tree, it is, so to speak, glued to it, and does not fall like *Yama-mai*. It is very fond of water; thrice a day I gave the worms a fine and soft rain, which always revived them. The fourth moult is the most

* *L'Attacus Atlas*, le géant des Papillons; son introd. en France, par M. A. Braine et Maurice Girard.

perilous: a scarcely perceptible black speck appears under the last segment, and spreads so that in two days the caterpillar is wholly changed in colour, and decomposed. . . . The silk is of the same colour as that of *A. Cynthia*: it is very strong and brilliant. I have not been able yet to attempt the winding, but hope to report on this shortly."

I am not aware that this hope was ever fulfilled; nor that the world has heard any more of M. Braine's experiments. To his Memoir, which was originally published in the Bulletin of La Société d'Acclimatation, June 1873, M. Maurice Girard, the able and learned Secrétaire du Conseil, appended a *Note Entomologique*. In this we find a very valuable epitome of the genus *Attacus* (=Fam. *Saturniadæ*), and of *Atlas* in particular; so far as they were known up to that time. On the early stages of the species he has nothing to present except the note of Lady I. Gilbert, which he translates from Horsfield and Moore. He gives a description of the adult larva, but this is manifestly drawn up from the figure of the English naturalists, *not from the life*.

The closing remark of Dr. Girard is worthy of citation:—

"It is worth observing that this species, in those hot regions, behaves like *S. pyri* and *carpini* with us. The eggs hatch soon after they are laid; and the long latent life is that of the pupa. On the contrary, with M. Braine, it is the eggs which endure longest, as with the common Silkworm and the *Yama-mai*. This seems to point to a colder climate, and perhaps indicates the race as being from the Himalaya."

The first living examples of *Attacus Atlas* seen in this country, that I have been able to hear of, were a dozen living cocoons in the possession of Mons. Alfred Wailly of 110 Clapham Road, Memb. and Laureate of the Soc. Acclim. of Paris, and author of several interesting Memoirs on the Culture of Silk-producing insects. These cocoons had been imported direct from India, early in the year 1877; but not by M. Wailly himself, and he is not able to trace the exact locality, but believes that they came from the slopes of the Himalayas. It is remarkable that no Moth emerged from these cocoons during the whole year 1877, so wet and cold; but, in July 1878, imagines were evolved of both sexes, which proved to be a variety of unusual richness and brilliancy of colour, as well as of unusual dimensions;—one female, as M. Wailly assures me, measuring ten inches and a half in expanse. It is most unfortunate that he was unable to obtain any marriage of this race.

Meanwhile, in the spring of 1878, two hundred cocoons were imported from Bangalore, in South India, by Mr. Wm. Watkins of 36, Strand. Of these, fifty were purchased by Mr. Wailly, but the majority of the importation were (as I learn from Mr. Watkins), allowed to emerge* in order to procure a stock of ova, which afterwards he largely distributed.

Of these cocoons, two came into my possession, one from M. Wailly, on the 5th of May, the other from Mr. Watkins, a month later. The latter was the first to emerge.

Early in the morning of July 26th, I had the pleasure of seeing, hanging within the glass door of my cocoon-cage, a male of great beauty, and in high perfection. It differs much in form and colours from my old China specimen. It is very dark and rich in hues,† one-windowed; apparently the var. *n* of the Catal. Lepidopt. Br. Mus.; *Heterocera*, p. 1219.

* "So successful was I that I had only four bad cocoons, and *not one cripple*. I found, however, that, unlike most *Saturniadae*, they were not easily paired: in several instances, the sexes, though placed together when freshly evolved, refused to copulate. Some indeed did, for a few hours: others were united for twenty-four hours: yet from these I procured *no fertile eggs*. The only eggs that hatched were females that had been in copulâ for forty-eight hours." (Mr. Watkins in litt.)

† This specimen is quite worthy to be compared for beauty with that one described and figured by Mr. Adam White, as a distinct species, by the name of *Att. Edwardsii*. I know it, indeed, only by the diagnosis, description, and figure in the Proc. Zool. Soc. (1859, p. 115, pl. Annul. lvii.); the author has omitted to say where any type-specimen is preserved. The chief points of difference between mine and this species (?) are the following: the fenestræ have the longest angle pointing, in *mine*, towards the base, in *Edw.* towards the point, of the wings: they are margined with yellow in *Edw.*, of which, in *mine*, there is no trace. The white bands are wider: the black hue in the central region is wider, the luteous chains of the edges are more conspicuous, in *Edw.*; and the lovely roseate flush at the tip of the fore-wings, appears lacking. There is no reference to more than a single original; to constitute a species from one specimen, on variations such as these, is very hazardous, especially when the recognised species is one subject to so much variety. On the whole, I cannot but look upon *Attacus Edwardsii*, until further evidence appear, as a more than doubtful species.

It is right to mention, however, that a very high authority is of a different opinion. Since this note was in type, Mr. F. Moore, of the India Museum, writes me as follows;—"The *Att. Edwardsii* is undoubtedly a distinct species; . . . We have two specimens, male and female, in our Cabinet, from Darjiling. Specimens are also in the British Museum, which are referred to in Walker's Catalogue, Suppl. p. 524. The larva is unknown to me." As Darjiling is 7000 feet above the sea, and has a climate in which rain and snow are abundant in winter, and humidity is constant, it surely would not be difficult to acclimatise this noble form (be it variety or species) in the British Isles. And I cannot but hope that soon living cocoons may be collected by some of the residents there, and transmitted to us.

All this was to be learned afterwards. There it was, clinging to its own vacated cocoon, with horizontal wings; and thence it allowed me to remove it, tenderly, to another foot-hold, on which it remained till noon in my full sight, with no attempt at motion, except an occasional slow and dignified flap of the vast wings. Reluctantly, to preserve its perfect beauty, I now prepared a bed of bruised laurel, in a tight glass vessel, to which I transferred it together with its foot-hold. It stirred no more than before, soon lapsed into perfect quietude, and, as I hope, insensibility, under the powerful narcotic. At the end of seven hours I introduced a drop of Cyan. Pot. Sol. into the thorax by the side; though there was not the slightest sign of life; then pinned and set it, (by means of narrow strips of thin paper across the wings) with perfect ease and success.

Was I not a little hasty in closing the life of my beautiful new-born? I had yet another cocoon in my box, and I had some reason to think it would prove a female. But this was uncertain. If so, it might not evolve for a fortnight, and I might get no marriage. I knew that a single night's liberty would spoil the exquisite beauty of my treasure. And so, having well weighed the *pro* and *con*, I thought it safest to secure the moth for my cabinet in its perfection.

Possibly, had I read the future, my decision might have been different; for two days had not quite elapsed, when my other cocoon produced the imago, and this a female! It had, however, fallen from its hold of the suspended cocoon before I saw it; and contact with the bottom of the cage had prevented its due expansion; for, while the fore wings were perfect, the hind wings were shrunken and shrivelled. It was of a very different variety from the male, being of the two-windowed division, answering to var. γ of the Cat. Br. Mus., p. 1219. The distortion of the wings rendering this example useless for the cabinet, I determined to see how long she would live; and therefore placed her in a bell-glass of fourteen inches' diameter, quite open, as she was incapable of flight, the vessel resting in a flower-pot on a table in my study. She survived fifteen days, vigorous most of the time; for a week at least, I think she continued nubile, if there had been a bridegroom at hand. During the day she was motionless, the wings expanded horizontally; but at night-fall she began to flap her great wings with much vigour and incessant pertinacity,

and with the regularity of a machine, of which, indeed, the sound very much reminded me. She laid, in the first week, stuck in groups and strings to the surfaces around, about one hundred and sixty eggs, barren, of course; but which agreed in size, form, and colour, with fertile eggs of the species, which I had just received from the same sources as the cocoons.

EGG.

The egg of *Attacus Atlas* (Plate, fig. *a.*) is not so large as that of *Anth. Pernyi*, and not nearly so large as that of *Anth. Mylitta*, being about 0.08 inch in length, broadly, but irregularly, ovate, granular on the surface,* white, clouded with purple-brown, which tint centres in an irregular mass of intense depth. All this colour is readily washed-off by a few moments' immersion in water, the tinge being communicated to the water; leaving the whole surface of the egg of a delicate greenish-white. The darkest portion of the colour is now seen to reside in a knot of jelly-like membrane†, which, when softened by the immersion in water, can be drawn out to considerable length, but possesses great tenacity, and great elasticity, and adheres to the egg very firmly.

Of fertile eggs I received a dozen from Mr. Watkins, which had been laid on the 23rd July, and a dozen from M. Wailly, laid

* Examined with the Microscope ($\frac{1}{2}$ in. obj. Powell's) by transmitted light, the appearance of the egg-shell is highly curious. The whole substance is semi-opaque, studded equally everywhere with elliptic rings of light, separated by little more than their own area, and inclosing a space absolutely opaque. Each ring is brighter at one side of the circumference than at the other, which suggested the thought that the light was reflected from a raised edge of a cavity. But a revolving of the stage under my eye, made no change of the illuminated side: and a shutting-off of the rays from the window that impinged on the stage did not diminish it. It was therefore transmitted light through the rings; it was the same whether the interior or exterior surface of the egg-shell were next the eye. I can suggest no other explanation of the appearance than this: the entire shell of the egg is perforated, nearly (*not quite*; for the light of the ring is not quite the light of the sky reflected from the stage-mirror, but evidently transmitted through a very thin medium), by a symmetrical series of ring-like cuts, within the area of which the shelly substance rises exteriorly into thickened knobs; whence the deeper opacity; and which produce the delicate granulation. It is probable that here is a provision for the supply of air to the unborn larva. But why should this species need such a provision more than others? In the large egg of *Mylitta* there is nothing like it. When this is examined under like conditions, there is an appearance of irregular pits all over the shell, but there is no transmitted light, no semblance of even approximate perforation.

+ The alternately distended and collapsed egg-tube. (See Owen's *Comp. Anat. Invert.* (1855) p. 401; fig. 158.)

just a week later. Curiously, these two batches were hatched on the same day and hour, viz., between 6 and 9 A.M. of the 9th August. Already the little worms manifested the sluggish character common to them through life: they were slow in issuing from the egg; and then crawled little, and slowly.

LARVA.—1st age.

The new-born larva is about 3 lines long in repose, 5 lines when crawling; (fig. b.) General colour black, with a broad band of light grey running down the back for the whole length, and crossed, on the side of each segment by two white lines. The tubercles are tall cylinders of pure white, tallest in front: all of them have white bases, which, uniting laterally, form conspicuous transverse bars of white, one on every segment. From each tubercle proceed several very slender black hairs, of great length. Head glossy black, unspotted; the clypeus grey. Anal region white. Feet black. Prolegs grey.

The habit of the little worms is to sit on the under side of a leaf, almost always in a doubled, or sub-circular position, the head being bent round on either side, toward the tail. I detect no tendency to congregate socially, as *Att. Cynthia*, and *S. Promethea* do when young.

In addition to these, I obtained, at intervals up to 30th August, from Mr. Watkins, between sixty and seventy larvæ, almost all new-born; so that my education has included about eighty-five larvæ in all. My first solicitude was to feed my tender stock. I had observed that, in most cases, the first meal was made of the egg-shell; if the young worm were left for some hours, I found the vacated shell eaten to an extent considerably more than was necessary for exit; even to one-fourth of the whole egg.

Something more nutritive than this was necessary, of course:—but what? M. Braine had fed his protégés on the barberry; Lady Isabella Gilbert hers on apple, peach, plum, “&c.,” but implies that they did best on apple. Mr. Watkins recommended plum. I thought it well to ask the caterpillars themselves which they preferred. This inquiry (as I have done with other species) I put to them in the following manner:

A common flower-pot saucer I filled with an inch of sand, which then I made thoroughly wet, but with no standing surface-water. Into this I stuck one good leaf of each of the following

trees, observing that each was cut with a foot-stalk, and that the edge was entire throughout; careful to handle the leaves as little as possible with my fingers.

Oak	Apple	Berberis Darwinii
Sallow	Beech	„ aquifolium
Hornbeam	Hawthorn	Orange

When the leaves were thus made to stand upright in the firm sand, I tenderly transferred a single worm to each; and then clapped a bell-glass over all.

The first leaf that was nibbled was sallow (*Salix cinerea*); I saw the caterpillar in the act of eating it; for I kept the tiny nursery pretty well under my eye. Then the oak was just notched. The next morning willow and hornbeam were a good deal eaten; and on the day following, still more; oak a little eaten, and afterwards more. The one that had been put on *Berberis Darwinii* I saw on the second day busily and perseveringly gnawing at the central spine of one of the leaf-stipules; when it ceased, I saw with a lens that the hard and sharp point had been gnawed off. But very little more was done to this, and nothing to the other Berberry.

I noticed also the leaves on which they spontaneously chose to rest, as being suggestive:—they congregated, as I carefully noted their places, morning by morning, on oak and willow chiefly; hornbeam and *B. Darwinii* slightly; the rest not at all, nor on poplar, hazel, and birch, leaves of which I subsequently added: apple remained absolutely untouched, and even avoided.

With the exception of one killed by accident, as I was putting down the bell-glass, my first losses occurred on the day that the worms were one week old. On the 16th I saw several, in which the new white head of the second age was dilating the skin, and thrusting-out prominently the present head; a sure token of the approaching moult. But one was lying, not quite lifeless, but moribund, on the damp sand; shrivelled and drying-up. Another was one of those which I have alluded-to as close to the first moult: it also was lying helpless. This one I tried to aid. The minute grains of fine silver-sand were entangled between the tubercles, and in and among the pro-legs. My first effort was to remove these. If it had been able to crawl it would have thrown them off, and left them behind. But it was inert and helpless; and unless I could free the pro-legs it would not cling again, and

so would not be able to get through its moult, not being able to leave the slough behind, as every one knows.

With a lens in one hand, and a fine feather-point wetted in the other, I patiently removed the grains, one by one, avoiding any violence to the tender body. The grains adhering to the underparts, which would be most injurious, were hardest to be got at. At length, however, I pretty well got rid of all, and placed the little worm on a horizontal leaf. The power of clasping with the pro-legs was, however, so feeble, that the least movement made the worm roll over sidewise; and I feared to leave it thus. Then I bethought myself of the following device: I cut off a flat willow-leaf, and laid it, face-downward, on the sand; the midrib forming a slender projecting ridge. Against this I gently placed the little worm, and had the pleasure of seeing that presently the pro-legs had taken hold of the midrib, while the flat position of the leaf prevented the danger of rolling over. After a quarter of an hour, I perceived that the clasp was firm; and now I could gently lift the leaf, and turn it over in the air, the worm being below, without any relaxation of its hold. My care, however, proved vain; for the worm died where it was put, without being able to accomplish its moult.

Several now died in rapid succession. Wishing to preserve specimens in this age for my cabinet, and their minuteness precluding the hope of inflating the emptied skin, I took one or two of the dead worms as they were, and simply gummed them on a card. A day or two afterwards I perceived one of these bodies very much changed in appearance. Examination by a lens showed that the body was greatly eaten, the fragments lying strewn about; and by its side a loose cocoon, containing a white pellucid larva, about half as long as the little *Atlas* caterpillar. It was certainly lepidopterous; very nimble, much like that of a *Tortrix* or a *Tinea*: it had manifestly been parasitic in the *Atlas*. This contretemps gave me a new glimpse of the perils to which my pets were exposed.

But some passed happily through their first moult. One of these I was so fortunate as to detect at the beginning, and watched to its completion. The process is familiar to all silkworm breeders, and needs not to be recorded anew. What seems noteworthy is, that the tubercles were (not only as they were successively uncovered, but even after the process was completed)

very considerably shorter and more conical than in the former stage. "Parva componere magnis,"—the new-skinned larva reminded me of one of the rays of *Uraster glacialis*, for the cone-shaped tubercles. In a few minutes, however, I was conscious of a change in their form; they were evidently lengthening, by the protrusion of their points, into tall and slender columns. As these grew, insensibly, yet rapidly, the extremities were thrown into angles and curves, which presently were gradually straightened: just as we see the wings of an imago, on emersion from pupa, expanded, not uniformly, but very irregularly, one side at a time, through which the fluids are pouring; while, in the parts immediately near, they are, for the moment, inactive. The result is, to distort, and bend, and crumple, one portion at the expense of another, till this in its turn receives its supply, and presently straightens. So with these crooked tubercles: they were crooked because (minutely slender as they were) the expanding fluids were pouring through a portion of their diameter at a time: but, as I have said, all was equalized in due course, and every tubercle became a very tall and slender cylinder with an expanding base and a slightly clavate summit; and the symmetry of all was perfect, before an hour had passed from the beginning of the moult. So long were they now become (viz. about equal to the diameter of the body) that the impression produced on the unassisted eye was that we looked on a very hairy caterpillar; though, really, there were no hairs, but a few excessively short bristles at the clubbed tip of each tubercle, so minute as to be detected only with high magnifying.

LARVA.—2nd age.

The larva of the second age, a few hours after its moult, may be thus described. Dorsal portion of the body white, mottled on the sides with neutral-tint and cream-colour: a large irregular patch of rust-red on each side on the third and fourth segments, and another of the same hue, still larger, on the ninth, tenth, and eleventh. Ventral surface black. Tubercles white; except the lowest series of the three thoracic, and the penultimate segments, which are dark grey. Head polished chestnut-brown. Prolegs grey.

The next day after the moult, the whole larva is clothed with a white farina, very thick and clogged, similar to that of *Attacus Cynthia*, but much denser. It seems to be exuded only from the

white parts; and not from the grey, black, and red spots: though so copious is the exudation that these coloured patches are considerably encroached-upon by the intrusive substance.*

On the 26th—ten days after the first moult—one of them, by a second moult, passed into the third age. I had observed it at 9 A.M. the new head projecting, waiting its change, and at 11 all was completed. It was on the same leaf as before, just above the sand; where the exuviae, if fallen from the leaf would surely have been lying; but I searched in vain for any trace of it, except a tiny heap of cylinders of white farina, which, I presume, had clothed the old tubercles, and in the middle of these the old skull, or rather skin of the face. I could not avoid the conclusion that the new-changed larva had made a meal of his cast-off clothes. I had many such examples afterwards, and in some instances actually saw a good part of the exuviae devoured; so that this habit may be considered normal.

LARVA.—3rd age (newly moulted).

The larva, in passing into the third age, has not conspicuously changed in colour; but by careful examination I detect differences. The general ground-hue is a semi-pellucid white. The upper and middle series of tubercles, longer and slenderer than before, are white, the lowest series blue-black. The first segment is dark grey, between the white bases of the tubercles; the hinder three segments are minutely speckled with grey. The sides are marked, on each segment, with four diagonal bands, irregular in outline, highest behind, of which the upper two are pale grey tinged with red, the lower two dark grey. The two irregular clouds of rust-red, on each side, are become somewhat wider, and somewhat brighter in hue. The face is polished light bay, the lip dark, the cheeks white. Feet and prolegs dark grey, with deeper bands: the hindmost prolegs have a thickened margin of

* I suspect that this substance is a true Wax, analogous to the *Pe-la* of China, and to the *White-lac* of Madras. (*Kirby and Spence*, Lett. x.) Having allowed a caterpillar to touch the surface of a plate of glass, I examined it by the microscope. I saw many groups of very short and very slender fibres, so arranged as to suggest that they had been exuded in thin laminæ of definite width, which then had partly disintegrated (perhaps by contact with the glass) into their component fibrillæ; for they manifestly had been parallel, and still had curves and irregularities of form, in common. Having lifted, with care, a minute portion from the tip of a tubercle, by the point of a needle, and transferred it to the glass slide, this appeared much more as irregular thin plates, of which the fibres, though visible, were much less distinct, and less apparently parallel. The substance resembled wax, in its adhesion to the glass, and in the smear it left when moved.

cream-white, which gives a curious appearance of a sort of pedestal-basis to the extremity of the animal. The length when crawling is about nine inches.

On the same day another larva had arrived only at its first moult. The protrusion of the new head had been going-on increasingly, so long, and it was manifestly so uneasy, that I thought its moment must be near; and I carefully removed the leaf on which it rested to watch the process. But so long it continued to writhe, inflating its fore-parts, and turning painfully from side to side, that I began to fear its case was hopeless, and that there would be no moult. In such cases, I have before given mechanical aid with success. I now got a fine needle, and under a powerful lens I essayed to abrade the stretched skin behind the black old head. But these touches of mine only made it toss from side to side more violently, and, at length, to loosen its foothold of the midrib of the leaf on which it had clung.

At last I reluctantly gave up hope, and left it lying on the leaf. In half-an-hour, however, I again looked; when, to my surprise and pleasure, I saw that it was more than half-moulted, and looking most promising. There was, however, no attachment of the hind prolegs, and I knew there would be difficulty there. Thus my obstetric aid came in; for with the point of the needle, I held back the pushed-down skin, till the tender hind-parts, even to the last segment and prolegs, were duly drawn out, without the slightest lesion. Then it appeared a quite normal and healthy worm of second age. Yet it never ate more, never grew, never crawled,—but shrivelled and died, like so many more, in four or five days!

A curious instance of self-help occurred under my eye. A larva of second age was evidently annoyed by the fœcal pellet, which having been duly ejected, hung, from some accidental contact at the rectal orifice. I watched. Presently it elevated the hinder parts, and bent them round leftward. Then the head was brought round to the same side, deliberately, and as if with difficulty. At length with a jerk, and a snap, it seized the pellet in its jaws, and threw it out to some distance in front.

But, one by one, they all died. The one that had attained the third age, survived the longest, but succumbed on the last day of August. The larvæ of this species do not in any age either fall, or crawl from their twigs, while healthy, as do some of their

congeners. On two or three occasions I have found the larvæ of *Atlas* on the sand, apparently uninjured, evidently just fallen, and I have replaced them and they have taken hold; but these invariably died without removing farther. A fallen caterpillar is a lost caterpillar, at least in *Attacus Atlas*.

Before matters had quite reached this pass, however, I had procured, from Mr. Watkins, nearly sixty more larvæ, mostly new-born, but a few just entered upon their second age. These came on leaves of plum, on which Mr. Watkins tells me he had fed them exclusively. Yet I thought well to give them a choice of food as before. Accordingly, I had prepared for their reception a six-inch flower-saucer of wet sand, into which I plunged leafy twigs of willow, plum, apple, and Japan quince. The larvæ were sent through the post in tin canisters, in two lots, arriving on the 25th and 30th of August. Some of the first lot were dead, but these were not counted: the second lot were all active. Among the twigs of their nursery I distributed the plum-leaves which sustained the larvæ, carefully handling them by means of pliers, avoiding contact with my fingers. Fearing that I had kept my former in a too confined atmosphere, I decided to give these a freer air, trusting to their proved stationary habit to avoid loss by wandering. Accordingly, the saucer with its little forest, now stocked, I placed in the bottom of a thirteen-inch bell-glass, seated in the mouth of a flower-pot;—covered, indeed, with a piece of white blonde at first, but after a few days allowed to remain quite open in my study-window, the window open day and night at top, facing the S.E.

These conditions, with an exception of place to be after-mentioned, remained unchanged, during the history. The food, also, I by-and-by made wholly fallow; for I found, after a full fortnight's trial (during which I had offered oak, sloe, and pear in addition), that they manifested a very decided preference for fallow, above all,—plum alone maintaining any rivalry with it.

The leafed twigs maintained their succulence well in the damp sand. At intervals of three days I changed the food, and examined the larvæ, keeping a careful register of the number, as distributed in their several ages. My procedure was this: I spread a large sheet of paper on a table, to which I lifted the saucer from the bell, which latter I cleaned out. Then I removed one by one, with pliers very carefully, the old twigs,

laying them tenderly on the paper. A new set of food-twigs had been already prepared; and the surface of the sand in the saucer having been swept of frass, and damped afresh, these fresh twigs were stuck-in, and the saucer re-placed in the bell-glass. Now the effete twigs were subjected to a searching scrutiny; such of the leaves or shoots as supported worms were cut-off with scissors and dropped among the new leaves, examined, and counted, and recorded at the same time.

My little family quickly diminished. Scarcely a single examination passed without revealing some corpses lying flaccid on the sand: but even more were unaccountably missing. This fact, occurring again and again, greatly surprised me. The circumstances made it impossible that any could be overlooked. I examined every leaf with the utmost minuteness, and laid it on paper for re-examination if desirable. The area was a flat surface of wet sand, on which the worms, dead or alive, could not be concealed. The saucer was searched on all sides before it quitted the bell: the clean glass of the bell, when the saucer was removed, would not conceal a cheese-mite. What then could have become of six, and eight, and three worms, absolutely vanished in intervals of three days? I can only suggest that the living larvæ devoured their fellows! I have abundantly proved that the newly moulted eat their own cast skins: and the transition from this to the eating of their dead or dying fellows, is perhaps, not very great. It is noteworthy that none were ever missing after the earliest stages were passed.

Individuals of this family passed into their successive ages at intervals of about seven or eight days; viz., on September 1st, 7th, 16th, 24th. On the 9th, half of the stock were gone, only twenty-five left; on the 17th, when the fourth age was reached, twelve were left; on the 24th, when the fifth age, seven were left. From the first I aspersed the whole nursery four or five times a day, by drawing my finger along a nail-brush dipped in pure water, and depositing an impalpable dew on the whole. I fancied that the worms enjoyed the moisture in so fine a form.

LARVA.—3rd age (advanced).

I have described the larva when newly passed into the third age. After a few days it was much changed in appearance. So wholly and so thickly was it now clothed with farina, that it appeared entirely snow-white, the

orange clouds on the sides seen only as tiny specks; the iron-grey of the lowest tubercles, the feet, and the mottling of the last three segments, all distinguishable only by using a lens; when even the white cheeks are seen to be sprinkled with the same flour. The tubercles of the dorsal and middle rows are very thickly clothed; and by their arrangement give a peculiar aspect to the caterpillar, which it had not before, not even in this stage at first. Those of the prothorax project over the head in close array; those of the metathorax are perpendicular; those of the mesothorax sloping intermediately. Then the abdominal series have a strong backward inclination, and about equally; so that the transition from the thoracic to the abdominal series is abrupt and marked in the *facies*, though really the former are graduated *inter se*. The length now attains about one inch.

LARVA.—4th age (fig. c).

Greenish-white; the skin all studded with minute oval darker specks, which give the impression of translucent cells in the substance. The orange clouds on the sides are nearly obsolete, especially the posterior ones. Last segment azure, with the oval specks dark blue. A rondo-triangular ring of rich pale orange is now conspicuous on the outside of each hindmost proleg. Face wholly pale green; lip and clypeus margined by a black line. Thoracic tubercles shorter and blunter than before; the rest much increased in length, and become soft spines, lying nearly flat, pointing backward and overlapping; lowest row dark iron-grey. Feet and prolegs iron-grey; the latter crossed by a band of greenish white. The farina is again very thick, and is excreted early.

(To be continued.)

GRANARY WEEVILS: SITOPHILUS GRANARIUS AND S. ORYZÆ.

By EDWARD A. FITCH.

OF all destructive weevils the one which most affects the much talked of "British interests" is the granary or corn weevil. Our own three and a half millions acres of wheat have enemies enough to contend with, attacking, as they do, root, stalk, leaf, ear and kernel; but it is after the corn has passed safely through these and other ordeals and is harvested, threshed and granaried, that the *Calandra* appropriates the never to be wasted bread-stuff. The damage to our home-grown wheat, however, is but as a drop in the bucket compared to its destruction of foreign grain, and that drop is, in a sense, of our own seeking, as home-grown

wheat would never become affected unless either that is taken to the weevils or the weevils brought to it. It is certainly at times necessary that it should be granaried, but the damage by weevil is always occasioned by carelessness or heedlessness in shooting it in old dirty, uncared-for granaries or mills, which themselves are sure to harbour the little beetles, or by laying it in close proximity to some affected foreign corn. With foreign wheat weevils are a necessity. Our immense imports—somewhat exceeding our home growth, and drawn as they now are from all quarters and corners of the globe—are either affected on shipment or speedily become so from the dirty, unswept and uncleansed granaries into which the corn finds its way. The little pests could certainly be got rid of by shippers to a great extent if they would only try. The improved service and quickened passages has lessened weevil loss in corn to a remarkable extent within the last few years. Question a corn merchant used to foreign trade, and the answer will be somewhat as follows:—"Oh! we know and hear nothing about weevil now to what we used to years ago. I have seen cargoes absolutely alive with them, and so that they burnt everything up."

The wheats which are now affected to any very serious extent are the Indian, and I have often seen samples of the excessively dry Calcutta and South-eastern Asian wheat in which it was almost impossible to find a perfect corn, the valuable starch of the kernel being consumed by the destructive little weevils. *Calandra*, like wheat and many other useful products, with their attendant evils, is undoubtedly an introduction from the East. Weevily wheat is invariably dressed after landing, and a large percentage of the little beetle are thus screened or blown out, but, of course, many of the perfect insects resident in the corn, and all in the larva or pupa state escape, the kernel not yet being light enough to be separated. When the cargo is very badly affected—when the whole bulk seems alive, as I have myself seen them on very hot summer days—it is a common practice for merchants to spout it, *i. e.*, to shoot the grain down a spouted trough, in which at the angle is a wire sieve with the meshes large enough to let the weevils pass through, but not the corn, which runs into the granary or into sacks as the case may be. By such means the quantity of weevils and dust sifted out is enormous, and this appliance is generally so situated at the wharves that the beetles

are deposited near the edge of the wharf or even in the river bed, and if not naturally washed away at high tide, are swept into the water, their destruction being thus easily accomplished. The great heat generated in a bulk of weevily corn is caused by the dust arising from the borings and frass of the insects. The weevils themselves are generally to be found inside the granaried heap or cargo of corn unless the weather is very hot; then they are especially lively on the outside.

Although these granary weevils are the most destructive enemy to stored corn, they leave sound what they do not actually attack. This is not so with that other great enemy, the wolf moth (*Tinea granella*, L.), which spoils more than it eats, by spinning the grains together with its dirty silken web, and thus becomes a more troublesome pest perhaps, though less destructive, than the *Calandra*. This is a somewhat analogous case to the attacks of mice and rats in corn-stacks, the least enemy being the greatest spoiler.

Reliable statistics as to actual damage are always difficult to get. The Rev. D. J. French tells us that sixteen bushels of weevils were dressed out of 360 quarters of wheat in December, although the corn had been turned every week (Entom. iii., 59), but the worst attack I find recorded is on the excellent authority of Mr. James Vogan, brought before the meeting of the Entomological Society by Mr. Jenner Weir, April 4th, 1870. It was stated that 10 cwt. of weevils were screened from 74 tons of Spanish wheat, and "that in August, 1868, some American maize was stored, weighing 145 tons; in August, 1869, this was found to be infested with weevils, and 6 cwt. of the beetles were screened out; in December, 29 cwt. more were screened out, making a ton and three-quarters in all." ('Proc. Ent. Soc.' p. xv.) We are not told what the maize actually lost in weight, but 35 cwt. of weevils must have consumed something very considerable. This quantity would represent over four thousand millions (4,056,729,600) specimens of the beetle. By actual weighing and counting, I find 1 ounce (avoirdupois) contains 530 grains of sound English wheat; or 1320 grains of weevil-attacked kernels, consisting of English and foreign wheat mixed with many imagos and larvæ of the *Calandra* in the corn; or 64,680 specimens of *Sitophilus oryzæ*, consisting of dead imagos, but not old and dry. From these numbers the calculation of damage is not difficult, but it

also becomes plain how soon the attack may become a matter quite beyond all calculation or remedy.

The life-history and description of these little pests has often been written, but in very few instances has it been from actual observation, changes being rung on the copies and recopies from the older observers downwards. From the limit of circulation these were of necessity original, and in the case of many insects, owing to superstition and folk-lore, they are indeed very original. In Britain, Kirby and Spence, and Curtis are still served up in all forms, without a particle of attempted original research, or even new information or confirmation, in many of our special journals devoted to agriculture and horticulture. It is this which delays progress; independent observation is needed, even if not to establish new facts, to confirm many old beliefs. Now with regard to these corn or granary weevils, *Sitophilus granarius* and *S. oryzae*, their economy may not be of great import; we know the damage and we know the damager in its perfect form, although its larva is the first destructive, and in its earlier stages, living as it does inside the corn itself, it is safely entrenched and impregnable. Probably from these circumstances the granary weevil has been much neglected by entomologists. Curtis's information is all derived from Leuwenhock and Olivier; he knew neither eggs, larvæ nor pupæ. Few there are who have scientifically examined the species of weevil and other allies which affect the various cargoes of grain.

The *Calandridæ* is a family of *Rhynchophora*, which contains many exotic species, whose larvæ are very destructive to various valuable palms and cycads. It is somewhat remarkable, for including species so different in size as the large *Calandra palmarum*, which measures nearly two inches in length, and our little *S. granarius*, which scarcely exceeds one-eighth of an inch. The larva of *C. palmarum* is (or was) celebrated as being considered such a delicious dainty by the natives and even others (*teste* Kirby and Spence). To this family belongs the species which, as Rye observes, is emphatically known as *the* weevil. These weevils, which include both scientifically and naturally two closely allied species, are now included in Schönherr's aptly-named genus, *Sitophilus* (= grain-loving). In all weevily corn the snouted unicolorous *S. granarius*, and the *S. oryzae*, which has two red spots on each wing-case, will be conspicuous as the

most abundant and most destructive insects. As far as my own experience goes *S. oryzæ* is by far the commoner of the two.

These weevils are frequently accompanied by many other *Coleoptera* belonging to different families, the economy of which is little known. Curtis mentions five species as so found, viz., *Silvanus surinamensis*, L., *Cucujus testaceus*, Fab., *Ptinus crenatus*, Fab., *Uroma cornuta*, Fab., and *Trogosita mauritanica*, L. I have met with fifteen. Four of these and a near ally of another are mentioned by Curtis—the large black carnivorous *Trogosita mauritanica*, of which I found two or three specimens in the spring; the abundant and variable little *Silvanus surinamensis*; the much less common, large, reddish *Uroma* (*Gnathocerus*) *cornuta*, and the active, flat, brown *Læmophlæus ferrugineus*, Steph.—Curtis's *Cucujus testaceus*—which, except in one instance, was not generally common. In November, 1878, I found a specimen of the somewhat spider-like *Ptinus fur*, L., crawling on the glass of one of my stores, in which nothing had certainly been introduced since the previous autumn, so that it must have bred there. In addition, I have found the little Brachelytrous *Stenus unicolor*, Er. (= *brunnipes*, Waterh. Cat.), but only one specimen, which probably got in by accident; it is micro-insectivorous: the round, shining *Gibbium scotias*, Fab., was also probably an accidental visitor, as were certainly the few specimens of *Coccinella bipunctata*, L., which were found; the dark brown, elongate, cylindrical *Rhizopertha pusilla*, Fab., was very abundant; the pretty oval, four-spotted and lively *Alphitophagus 4-pustulatus*, Steph., only occurred in one store, but then commonly; the two red-brown *Tribolium* (*Stene*) *ferrugineum*, Fab., and *T. confusum*, Duval., occurred generally, as did the more shining *Hypophlæus depressus*, Fab.; the well-known *Tenebrio molitor*, L., was found occasionally, and its “meal worms” are still feeding away in two or three of my stores. The samples were not all of equal quality; for instance, No. 1 contained *S. oryzæ*, *R. pusilla* and *Silvanus* very commonly, *T. ferrugineum* rarely, and a few of *L. ferrugineus*, but no *S. granarius*. No. 2 contained *S. oryzæ* most of all, *R. pusilla* very abundant, *T. confusum* a good many, and *G. scotias* one or two specimens, a few *S. granarius*, but no *Silvanus*, and no *L. ferrugineus*. No. 3—the Stambourne store—seemed to be altogether different; here was *H. depressus* instead of *Tribolium*, *S. granarius* instead of *S. oryzæ*, together with *A.*

4-pustulatus quite common, *S. surinamensis* and *L. ferrugineus* common, these last two species less abundant than usual, and so on. No. 3 was dressed from English wheat which I believe had been granaried at Stambourne in North Essex. Dr. Power* has kindly named the species for me in all instances. I also met with many specimens of an Hemipterous insect in various stages

* In answer to my queries Dr. Power has kindly written me as follows:—*Cucujus testaceus*, Curt., in Waterhouse Cat., is given as the same as *ferrugineus*, but both in Waterhouse and in the modern Sharp's Cat. the genus *Cucujus* vanishes, and the insects are all *Læmophlæus*. I have taken all the British species, but invariably under bark, &c., excepting only our friend *ferrugineus*, so that I suppose is the only "corn-lover." There is one species most closely resembling it, *L. duplicatus*, but I only know it as a bark insect. *Silvanus*.—I have taken several species, always under bark, or by sweeping, with the sole exception of our *surinamensis*, which is manifestly sitophilous; *S. unidentatus* is common under bark, &c., and the nearly allied *Nausibius dentatus* comes with sugar as far as I know. *Hypophlæus*.—Other species, as *bicolor*, *castaneus*, &c., always in or under bark, but our one species, *depressus*, I have always had from granaries; I never saw it "at large." *Tribolium* I never saw "at large"; *T. ferrugineum*, one of our species, I used to get from granaries at Cambridge; of the other, *T. confusum*, I found one or two mixed with my *ferrugineum*, but never saw many till you sent it; it is not in Sharp's or Waterhouse's Cat.; we used to call the other species *Stene ferrugineum* in J. F. Stephens' days. *Calandra*.—I used to get both species from the granaries as you do; as to the name, Waterhouse changed it into *Sitophilus*, but in the more recent Sharp's Cat. it is again *Calandra*, which I suppose should stand. *Alphitophagus* I used to get from granaries only, as you do, at Cambridge, but have not seen it alive for forty-five years until now. *Uloa cornuta* used to occur in meal, and of course *Tenebrio*, though I also take both species of *Tenebrio* at large. There is another beetle, *Niptus hololeucus*, which you have not mentioned, which one constantly finds marching about at large, and which I believe to be almost omnivorous, but I had once a specimen of corn meal containing it in hundreds. I kept it in a closely stoppered bottle which was never opened and for three years it continued to breed, developing larvæ, pupæ in a sort of cocoon, and the perfect insect, the numbers gradually diminishing. *Trogosita* I have taken at large in sandy places, but never got it in corn. *Gibbium* and *Ptinus fur* I have occasionally found crawling about, but doubt their being corn-eaters; *Ptinus* I have found in old skins, &c., in animal rather than vegetable matter. *Rhizopertha* I never took myself, but from the appearance of the corn in which it was found I should suspect it of feeding upon it; T. Wilkinson and the Scarborough entomologists, who seem to have worked largely in granaries, &c., used to get a quantity of it. *Stenus* and *Coccinella* are of course accidental. I should think there can be little doubt that *Alphitophagus*, *Tribolium*, *Calandra*, *Uloa*, *Tenebrio*, *Niptus*, and I think *Rhizopertha*, are actually "sitophilous," but suspect, from the habits of other species of the same genus, that *Trogosita*, *Hypophlæus* and *Silvanus* may be parasitic. *Læmophlæus clematidis* is, I think, parasitic on *Xylocleptes bispinus*. The behaviour of *L. Clematidis* is very like that of *Nemosoma elongatum*, which I know to be parasitic on *Hylesinus vittatus*, and probably *L. ferrugineus* is the same with respect to some of these corn-lovers."

of development, which belongs to the genus *Piezostethus*, but does not agree with any of the British species, though it is nearest *P. rufipennis*, Duf. (= ? *cursitans*, Fall.). As might be expected, innumerable *Acaridæ* occurred; one very fine, dull brown, beetle-like *Gamasid* was very conspicuous, but was only found in the Stambourne store. There is certainly much yet left to repay a detailed study of *Calandra* and its surroundings, both as to which of the above-mentioned species are sitophagous and which predatory, also as to parasitism.

The increase of these *Calandridæ* and their allies is naturally limited by internal Hymenopterous parasitism. I have met with two (probably three) species of *Chalcididæ*, and Curtis knew another. About a dozen *Cerocephala formiciformis*, Westw., Wlk. (= *cornigera*, Wlk. = *Læsthia vespertina*, Curt., Hal. = *Epimacrus rufus*, Wlk. = *Lagynodes pallipes*, Voll.), or a very closely allied species, were bred. This is very interesting. Walker says of this, the only species of its genus, "It is semi-domestic and of rare occurrence, and may be parasitic on a house insect. I have seen it on paper at Killarney, in North Devon, in Lancashire and near London." (Entom. vi. 250). Haliday's figure of the species with details is there given, as also it was at 'Entom.' vol. i., pl. n., fig. 4, and in Part vi. of Walker's 'Notes on Chalcididæ.' In this figure the female is represented as wingless; my specimens are of both sexes, and in all the wings are fully or partially developed. According to Förster, Ratzeburg's *Sciatheras trichotus* is a synonym. This is described and partly figured in 'Die Ichneumoniden,' vol. ii., p. 209, pl. iii., fig. i. Ratzeburg remarks on its rarity; he only knew a single specimen, which being bred from worm-eaten ash was probably parasitic on *Hylesinus fraxini*. This specimen was a winged female, and the remarkable tuft of hairs on the wing is well figured. Although Dr. Mayr had not the species, I am indebted to him for the identification. The other chalcidideous parasite, of which I have over fifty examples, is a species of *Pteromalus*. Dr. Mayr writes me that he has over 10,000 specimens, mostly bred by himself, but the elucidation of such material is a work of long time and of great labour. Indeed, the *Pteromalidæ* seem beyond all control. Walker described upwards of 600 species, and I now have a number of his unpublished manuscript descriptions, mostly species of *Pteromalus*, which are quite useless, or rather would serve to make confusion worse

confounded. It is, therefore, as well not to give our *Sitophilus*-bred species a name at present. Curtis bred an apterous specimen of *Meraporus graminicola* from these weevils, but mine is not that species.

To return to the actual economy of the *Sitophilus*—the two species are so closely allied that practically they may be considered as one—the results obtained by that excellent observer, Miss E. A. Ormerod, are given in the present number, and my own observations are drawn from the study of the accumulations of the last three years, which now amount to eight distinct stores. It has been usually supposed that the parent weevil bores with its rostrum into the grain previous to depositing its egg in the hole made. I do not believe this is the case, for a very fine puncture only—such as would be made by a very fine needle—is to be seen on the borders of the germen in those grains which contain the larva. The egg is therefore laid, I think, just on the surface, as Olivier said, or under the outer skin of the germen, and the young larva eats its way in. One egg only is deposited in a grain, the flour of which just serves to bring the larva to maturity. It turns to a pupa in the grain, so that, unless very minutely examined, affected grains are not apparent until the emergence of the imago, except by their weight. The imago partially feigns death when touched, and on a tolerably smooth surface, such as paper or a painted board, can travel at the rate of about one foot per minute. How many broods there are in Britain is difficult of determination; it probably depends on many varying circumstances as to degree of warmth and the like, but the normal number is probably two annually. I have found the larva both in early summer and in late autumn. The rapidity of development also varies greatly. Hybernated imago, egg laid in May, second generation in August, is probably approximate for Britain in an unheated store-room. The only corn I have known to be attacked by *Sitophilus* is wheat, barley and maize. It does not touch oats, rye, canary, peas or beans, although Curtis appears to say some black oats (received from Lynn) were attacked in one instance ('Farm Insects,' p. 326). This statement, however, is not very clear; the attack may only refer to the wheat. In the larval state only one grain is destroyed by each insect, but it is probably much more destructive as an imago; and the beetles, which survive great extremities of temperature, appear to be

remarkably long-lived. Amongst some maize taken in 1876 affected with *S. granarius*, and in which I believe it has not bred, I have a quantity of specimens still (Nov. 1878) alive. It seems to breed very sparingly in this country, for when in want of a larva or pupa I have opened some hundreds of kernels from my stores without finding one.

As has been said, the *Calandra* is not indigenous, but through the agency of commerce—the importation of foreign corn—it has now become partially naturalised; but commerce, like agriculture, carries its own remedy against insect attack. Primitive commerce establishes the favourable conditions for the increase by supplying the requisite food and shelter almost in continuity. Primitive agriculture establishes favourable conditions by the increased supply of food through certain plants being brought into cultivation; hence the domestication, so to speak, of the natural limiter. But improved agriculture, by perfect tillage and cleanliness, establishes such rapid and perfect growth that the limiter loses its influence; so improved appliances in commerce will again protect the product against its natural foes.

The *Calandra* was encouraged by the necessary conditions to its existence being always present. In the granaries, always corn in some corner; in the means of transport, still food enough left to enable some to obey the high command to increase and multiply. Extended commerce necessitated a variety of materials and products for storage and transport, this to prevent mixing engendered cleanliness, and broke the chain of continuous favourable conditions; acting as the rotation of crops in agriculture. Then again commercial appliances with quicker and improved transport were greatly adverse to their increase. Although it is probable that, while we continue to import corn, we shall always suffer from weevil attack, the extent of damage will continue to decrease in proportion to the increase in facility of export and general improvement in commercial buildings and granary appliances. Old rough rafted partitions in warehouses and mills—the home of many noxious insects—are doomed; after their disappearance the spiders' work will not be required.

Many are the impracticable remedies which have been proposed for weevil limitation, but little can be expected from the use of specifics such as turpentine, benzine, and the like, or of various chemical preparations or “insect killers” Cleanliness

alone will do the required work, and this requires to be thorough to cope with such a crevice and cranny-loving, hybernating insect as the *Calandra*. Frequent lime-washing and scrubbing (with soft soap) of granaries, the plastering of all uneven wall surfaces, the asphaltting or concreting of all unlevel floors, the free use of the dressing machine or blower, and frequent sifting or turning over of the grain, are the only likely remedies against weevil attack. It is also necessary to guard against mixing sound wheat with any containing "weevil" except for immediate grinding; also to see to the destruction of all rubbish and tail corn in which it is possible for the beetles to live or breed. It was observed here during the late high tides, where corn was flooded, that the beetles were dispersed by the salt water; but this is only an accidental remedy which probably was worse than the disease.

It is an absolute necessity that in the case of ground wheat great quantities of the weevil, living as it does in the corn itself, should enter into the composition of the flour. This is unpleasant at least; but it has been conjectured that their presence is injurious, and in other countries disease has even been distinctly traced to the use of flour made from weevily wheat. Compare the vesicant properties of the *Mylabridæ* and *Meloidæ*. The following is an analysis of the *Sitophili*:—An acid analogous to gallic acid; a substance analogous to tannin; some chyline; some phosphate of lime; some phosphate of magnesia; some silica; various sulphates; a peculiar animal matter; some fixed fatty matters; a bitter principle; a resinous matter.

One of my stores, containing some thousands of *S. oryzae*, is kept in a closed tin, and repeatedly on opening this I have noticed a strong ammonia-like smell. Whether the internal application of "weevil" is injurious may be questionable, but enough has been said to show that its destructive powers are enormous, and that cleanliness and care will do much towards diminishing its ravages.

Maldon, Essex.

SITOPHILUS GRANARIUS,

By E. A. ORMEROD, F.M.S.

WE all know the *Sitophilus granarius* as one of our most destructive granary insects when left to pursue its ravages unchecked. Its rapid increase, and the total destruction of one grain of corn for each one of the myriads of granary weevils brought to maturity, make it a powerful enemy, but at the same time the effect of temperature on its powers of propagation acts as a check on its geographical distribution. The degree of warmth below which it will not breed, and its general history, have been given by various writers (see 'Farm Insects,' by J. Curtis, p. 324), but we have not yet the history of its near ally the *Sitophilus oryzae*, or rice weevil, as known in this country. Curtis mentions it as found in wheat from Ancona, and also in imported East Indian wheat, but did not trace out its history completely; and the probable effect of temperature on its rate of increase as well as on that of the *Sitophilus granarius* (our common "granary weevil") make it desirable to trace its life-history out in our own country, in addition to such notes of its habits as we possess from observers in the warmer continental climates.

During the last year (beginning at the 5th of September, 1877), I have had some opportunity of watching its habits as far as can be managed with a moderate supply both of weevils and of corn. Probably this comparative state of isolation does not give quite the same results that would follow study of the habits of the beetles in the great masses of corn in which they are usually to be found (in the case of Curtis's experiments on the *S. granarius* he was unable to rear it satisfactorily in small numbers), but still I had fair success, and found the increase of the *S. oryzae* to go on slowly and apparently with even more dependence on genial surroundings than that of the *S. granarius*. In general appearance and in size the two weevils are very similar, but the rice weevil is easily distinguishable by the two orange-coloured patches on each elytron, and also by the possession of wings, from the uniformly-tinted granary weevil, wingless in this country.

On the 5th September of last year (1877), I received from

Mr. Fitch a packet of the sweepings of corn ships known as "Indian dust," literally alive with these rice weevils from imports from the East Indies. At first they refused to have anything to do with English wheat sprinkled amongst them, straggling away at once from the grains and settling by preference on the broken bits of maize scattered with it; but after a while they commenced oviposition in the wheat, and on the 19th September the minute punctures showing the localities of oviposition were clearly visible at the extremity of the grain bearing the germ (where its softer nature affords an especially favourable position for deposit), and also occasionally in the harder part of the grain, but invariably on the convex side, never on that bearing the longitudinal furrow.

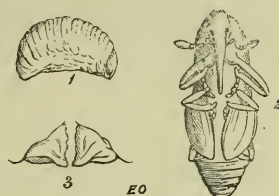
The punctures were obvious and in many grains, but though I searched repeatedly and with great care I was unable to find what might with certainty be considered the eggs—I found minute ovate-spherical bodies, which appeared to be eggs, both in the abdomen of the weevils and in the infested corn, but I did not find larvæ contained in them in any stage, and could not be absolutely certain of their nature.

On September 6th the beetles were pairing, and on placing them within reach of warmth from the fire they became very active, but during the rest of the experiment I kept them merely in the ordinary temperature of living rooms constantly used.

So far the autumn warmth, and warmth of locality, may have acted on increase, but after this I noticed no further advance till on the 9th March of the present year, when on examining some of the corn amongst which the weevils were placed on the previous 5th September, I found numerous wheat grains now each containing one larva, and there were also a very few pupæ, the latter, however, all dead in different stages of development. The infested wheat was easily distinguishable from the rest on pressure by the nail, the attacked corn giving way; the interior appearing to the naked eye simply as if the contents were more loosely arranged than usual, but showing under the microscope as composed of isolated atoms and variously broken masses of rejectamenta.

The thick fleshy grubs were now from a sixteenth to somewhat under the eighth of an inch in length when at their full stretch, but somewhat less in their usual curved position, and their breadth about two-thirds of their length. The grubs obtuse,

legless, and white; the head chestnut-colour; jaws also chestnut, darker at the extremity, bluntly pointed, and waved into two blunt teeth (see fig. 3). The segment behind the head and the caudal



extremity with a few small bristles. The movements of the larvæ during life and their contorted form after death make it difficult to sketch them satisfactorily, but fig. 1 represents a specimen fairly with the numerous corrugations which confuse the primary segments with the lesser folds, the under side being a complete mass of almost scale-like corrugations.

A few pupæ were now observable (on March 9th), but only two specimens were as fully developed as the one sketched at fig. 2, and on the 11th April the larvæ were active when disturbed in their grains, but no more pupæ were produced.

On the 3rd June I found only two more beetles, and on examining the grains of wheat I found one grain in ten with a tenant in some stage of development, for the most part still only in larval form and often stunted. A few grains contained specimens of the weevil in its perfect form, but for the most part they were small, distorted, and dead. As no farther progress was observable during the course of the summer, I made a selection of infested grains, but did not examine them particularly again till about the 26th October, when I found numerous beetles, but still not by any means corresponding in number with the infested corns of wheat, and the larvæ were still to be found in the grains, and some beetles only about half the ordinary size, and differing in marking from the normal type. In one case the elytra were altogether paler than the beetle, and in another the colour was prolonged from the spots so as to form a stripe, but the variety in marking, I believe, resulted simply from the sickness of the beetle having checked the usual development of colouring as well as of size.

In the healthy specimens the colouring was as in the

characteristic types, the wings were properly developed, and in one case I noticed an attempt at flight; but as far as one experiment goes, the slow rate of development which in thirteen months has only given one brood, and that not as numerous as the parent weevils, shows the effect of unfavourable climate or surroundings in materially retarding multiplication.

HYMENOPTERA IN NORFOLK.

By J. B. BRIDGMAN.

THE above heading would have been more correct if I had prefixed "want of," for this has been by far the worst season I have known for these insects. The first bee I met with was the male of *Anthophora acervorum*, on the 3rd of March; the unusually fine weather at the beginning of this month had tempted it out about three weeks before its usual time. The fine weather was soon over; the spring and summer here were generally dull and cold; so also was the autumn.

I have never seen the hedgerows so deserted by bees as during the past season. *Bombi* were scarce in the spring; and in autumn, when generally the red nettles abound with the workers, and thistle-heads with the males of many species of *Bombi*, and with these latter the males of their parasites the *Apathi*, this year these flowers were almost deserted. *Halicti* and *Andrenæ* were equally scarce; so in fact were the other genera.

I went to Brundall several times after the new *Nomada*, but could not find a single specimen. I was not much more successful in searching for *Macropis labiata*. After many visits I succeeded in taking a very few of both sexes on one day only, July 24th. Dull weather, with cold east winds, prevailed at this season. Two years ago I found a small colony of *Andrena Hattorfiana*, and took three females of the beautiful *Nomada armata* flying about the mouths of the burrows. I have not seen the *Andrena* since last year. I took another *Nomada* in the same spot, but could not find a single *Andrena* at the burrows or on the flowers of the Scabious in the neighbourhood; this is the only plant I have seen them frequent. In June I took for the first time, near this city, the pretty little *Andrena chrysosceles*. One of the best additions to my collection this year was *Bombus Smithianus*,

female and male; these were given to me by Mr. F. Norgate, of Sparham, who took them at Tresco (Scilly Isles).

Of the *Fossores*, the only capture worthy of note was *Agénia bifasciata*, two females and a male. I had not previously met with this insect; all three were taken running on the trunks of trees close to the city, and not near each other, although on the same side of the town.

I have to record two species of Ichneumons not included in Mr. Marshall's list:—*Cryptus amœnus*, Grav., and as neither this author nor Taschenberg has described the male, I have added the description of that sex, which differs only from the female in having the anterior and intermediate coxæ and trochanters white; hinder coxæ black, pale at the apex; hinder trochanter red, with a black spot above; the apex of the abdomen scarcely, or not at all, marked with white; both sexes of this insect were bred and kindly given to me by Mr. Laddiman.

Pimpla diluta, Ratz., also described by Holmgren, who describes only the female. I found two females and six males on the August Bank holiday at Brundall. The male, besides the usual sexual differences, is very like the female; the thorax has a little more brown on the mesothorax, and the extreme apex of the abdomen fuscous.

Opheltes glaucopterus. In Mr. Marshall's list only the female is noticed. As there is a good specimen of the male of this fine insect in the Norfolk and Norwich Museum, I take this opportunity of describing it. The only difference I can detect is that the prothorax, except the sides, pleura and metathorax are black, also a longitudinal streak of the same colour on the middle lobe of the mesothorax.

Norwich, December 27, 1878.

TWO NEW MICRO-LEPIDOPTERA.

By J. B. HODGKINSON.

DEPRESSARIA ATOMELLA, A SPECIES NEW TO BRITAIN.

During the summer of 1860, and again of 1861, I bred a number of this species from larvæ feeding on *Genista tinctoria*. The insect being so very handsome, and neither Allis, Edleston, nor any of our first entomologists, being able to identify it, I sent specimens to Mr. Stainton. He remarked that it was a pretty

form of *D. atomella*, the variation from the type (of what was then known as *Atomella*) being probably due to the difference of food-plant. For the last seventeen years I have bred this same species more or less freely; and it would appear, therefore, that my specimens were bred prior to the identification of it as a new species by continental entomologists. It is, I believe, proposed to retain for this species the name of *Atomella*, and to re-name the broom-feeding species (which has hitherto been called *Atomella*), *Depressaria scopariella*.

[The above communication is an interesting supplement to information which appeared in the E. M. M. for last month, and which information, Mr. Hodgkinson informs us, was based on specimens sent to, and on correspondence with, Mr. C. G. Barrett. Mr. Stainton, in his 'Natural History of the Tineina' (vol. xii. p. 226), points to the possibility of two species being confused under the name of *D. atomella*; and he states that "the two latest writers, Rössler and Von Heinemann, both agree in separating the broom-feeding species from that which feeds on *Genista tinctoria*, after we had for a series of years considered them identical."—ED.]

ELACHISTA DENSICORNELLA (*Hodg.*), A SPECIES NEW TO
BRITAIN.

Of this, hitherto undescribed, species I have been in the habit of taking occasional specimens for the last seven years at Grange-over-Sands, during the first week in June. I have sent, from time to time, specimens to Mr. Stainton. At first they were named by him as *E. tæniatella*, but from this nomenclature I dissented. However, after further examination, in another year he returned my specimens as new to science, differing from *E. tæniatella* by the thick antennæ. This distinction I had previously pointed out. Having now both males and females I think I may name and describe it. First of all it differs from *E. Adscitella*, *Zonariella* and *Megerella* by its black head, in which it resembles *E. tæniatella*. From this last species it differs in that it is smaller, the anterior wings narrower; and by the interrupted band on the wings, the sides of which are parallel; but the most striking difference is that the antennæ are considerably thicker than any belonging to the banded group of the family, and the body is also stouter; the head, antennæ, body

and cilia are black. I have not as yet been able to discover the larvæ, and have only captured it in a walk near to Mr. Maude's house. Had it not been for this gentleman's kind permission to collect there, this species would probably have remained unrecorded.

Preston, January, 1879.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

HYBERNATION OF BRITISH BUTTERFLIES: SATYRUS EGERIA, &c.
—With regard to the hybernation of *Satyrus egeria*, the Rev. Joseph Greene in his paper, on "Pupa Digging, says:—"I have several times met with the pupa of this butterfly suspended from blades of grass when digging at the roots of trees. It is a beautiful grass-green colour, and passes the winter in that state." I have myself on two occasions met with a grass-green pupa suspended in the manner described, when digging in the autumn. One I found on September 16th last year, but as *S. Egeria* is very rare here I am inclined to think my pupæ were not that species. but *S. Megæra*. Unfortunately both died in the pupa state, and therefore I cannot be sure about the species; neither can I tell whether, under more favourable conditions, the perfect insects would have appeared as late specimens the same year, or remained over till the following spring. It is certain that *S. Megæra* does not always hibernate in the pupa state, since larvæ may be found feeding on grasses on mild spring evenings long before any perfect insects have put in an appearance; and this induces me to think that the pupæ I found would have produced perfect insects in the autumn had they been healthy. Possibly Mr. Greene may have had *S. Egeria* from his pupæ, in which case he could throw light on the matter. The fact that some of Miss Sotheby's larvæ became pupæ in the autumn does not go for much, since larvæ that are surrounded by abnormal conditions do not in all cases behave in a strictly normal manner. I see Mr. Fitch deems it necessary to give authorities in support of his statement that *Thecla rubi* passes the winter as a pupa. This fact has been established for so many years that no corroboration of Messrs. Buckler and Barrett's account is required, but as I am in the habit of taking the larva every season I may say that there need not be the slightest doubt upon

the point. Mr. Fitch further says that Mr. Moncreaff is the only authority he can find as to the hybernation of *Polyommatus Phlæas*. I believe there is a larva at the present time hybernating on dock in my garden. I saw it early in the winter, and unless it has since been killed by the severe weather fully expect to find it again after the snow has melted.—W. H. HARWOOD, 8, West Stockwell Street, Colchester.

POLYOMMATUS PHLÆAS.—With regard to Mr. Fitch's article on hybernation of the British *Diurni*, in the January number of the 'Entomologist,' I find this larva full fed in April, when looking among sorrel roots for *Gelechia* larvæ. I know it well. This, I see, confirms Mr. Moncreaff's notes (Entom. iii. 41).—J. B. HODGKINSON; 15, Spring Bank, Preston, January 9, 1879.

LYCÆNA ALEXIS HERMAPHRODITE.—A friend of mine while botanizing on the downs near Winchester, on August 23rd last, noticed a fine hermaphrodite example of this insect, which he captured, and, knowing my partiality to the *Lycænidæ*, very kindly gave it to me. The specimen has the wings on the right side male, and on the left female; rather shot with blue, and with a small wedge-shaped streak of lavender extending partly across the under wing.—WALTER P. WESTON; 1, Duncan Terrace, N.

COLIAS EDUSA AND ACRONYCTA ALNI.—While staying at Freshwater, in the Isle of Wight, in the middle of August, 1878, I saw about a dozen specimens of *Colias Edusa*. I also saw one on the London and South Western Railway, near Southampton. I beat a nearly full-grown larva of *Acronycta alni* off beech in the New Forest on August 14th, but lost it while travelling.—C. G. NURSE; Southgate Green, Bury St. Edmunds, January 14, 1879.

COLIAS EDUSA IN DECEMBER.—I have now a fine living specimen of *Colias Edusa*, which I found on ivy last week. Is this not an unusual occurrence at this time of year?—JOHN STEPHENS; 3, Lee Road, Blackheath, Kent, S.E., Dec. 23, 1878.

DESCRIPTION OF THE LARVA OF COLLIX SPARSATA.—On the 18th of August, 1877, I received from Mr. F. D. Wheeler, of Norwich, a dozen larvæ of this species. They were of various stages of growth, but in a few days the largest were full-grown, when I described them as follows:—Length nearly an inch, and of average bulk in proportion; head rather flattened above, but

rounded at the sides; it is slightly narrower than the second segment, into which it can be partially withdrawn; body cylindrical and of almost uniform width throughout, tapering only a little from the eleventh to thirteenth segments posteriorly, and from the third to the head anteriorly; skin smooth and soft, having a few almost imperceptible very short hairs. Ground colour, bright pale green, the head pale brown; a green pulsating vessel shewing between a double whitish line forms the dorsal stripe; subdorsal lines also whitish, and there is another whitish line below them, but some distance above the spiracles; below the spiracles is a conspicuous broad stripe, whitish with a very faint blue tinge; segmental divisions yellowish; spiracles black; ventral surface almost uniformly pale green. Feeds on *Lysimachia vulgaris*. Before the middle of September all the larvæ had spun up; the cocoons were formed on the bottom of the cage and were tolerably firmly constructed of silken threads. The pupa is polished, about three-eighths of an inch long, and tolerably plump; it is of the ordinary shape, thickest at the ends of the wing-cases, and tapers rather suddenly to the anal tip; eye, antennæ, and wing-cases well defined. Colour of the abdominal segments rather pale brown; head, thorax, and wing-cases green. The first imago emerged on the 11th of June following.—GEORGE T. PORRITT; Highroyd House, Huddersfield, January 4, 1879.

NOTES ON BOMBYX QUERCUS.—It is now some years since I collected *Bombyx quercus*, but the following notes made in 1871 and 1872 may be of use to Mr. Laddiman in his investigations (Entom. xi. 270). In 1871 I took nine larvæ; two died in the larval state, three I gave away, two ate out of their cocoons as soon as they were spun, and died, and one imago emerged; leaving one cocoon to be kept over the winter, which rewarded me on June 22nd, 1872, with what I believe to be the variety *Callunæ*. In 1872 I took nine larvæ again; they all spun up, but only five imagos were the result, as in the previous year showing a large death-rate. The greater part were fed in a larvæ box, placed under some trees in the garden, the lid of which was covered with perforated zinc; after the cocoons were complete they were removed to a cage in the house.—GEORGE R. DAWSON; Poundsworth, Driffild, December 5, 1878.

OCCURRENCE OF MICRO-LEPIDOPTERA IN THE NEIGHBOURHOOD OF PLUMSTEAD.—I went down to Plumstead early in October to search for the larva of *Coleophora fusco-cuprella*, three of which I bred in June last from larvæ collected there the previous autumn, on hazel. In one sheltered spot I found twenty-three larvæ of this species, but they appeared to be very local, my captures being made in the space of about a dozen yards, and although I searched the neighbourhood for some distance I was unable to detect any trace of it in any other place. *Nepticula microtheriella* was widely distributed, and although rather late for the larvæ, many of the mines being empty, I found above a score, with a few of another species. *Ornix avellanella* and *Lithocolletis corylella* were in the greatest profusion on the same bushes. The mines of *L. acerifoliella* were also abundant in maple leaves; and a fortnight earlier, between united leaves, the larvæ of *Gelechia scriptella* were not uncommon. *Thecla betulæ* occurred sparingly in birch leaves, and *Lithocolletis ulmifoliella* commonly. The brown mines in dogwood of the larvæ of *Antispila Treitschkiella* were not so frequent as usual, but I secured sufficient to breed a fair series. *Coleophora albitarsella* were in numbers on the ground ivy and *C. gryphipennella* on the dog-rose, but as these do not become full fed till the spring is fairly advanced I left them for a more favourable opportunity. The bladder-like appearance of the leaves of *Artemisia vulgaris* betrayed the presence of the larvæ of *Gracilaria omissella*, while the roots supplied me with the larva of *Ephippiphora fœneana* and *Dicrorampha simpliciana*.—W. MACHIN; 22, Argyle Road, Carlton Square, E., Jan. 4, 1879.

TINEINA BRED IN 1878.—The following notes from my diary may be of use to beginners: *Psyche calvella*: a few specimens; larva taken in May on oak and buckthorn, at Highgate; according to my experience, it is useless to take any but full-grown cases. *Lampronia rubiella*, from raspberry, and *Incurvaria capitella*, from currant-shoots: larva inside, feeding on the pith; from a garden at Hornsey; bred a long series of each. *Scythopia cratægella*: freely bred from larvæ in a web on whitethorn; from Greenhithe. *Depressaria costosella* and *Gelechia mulinella*: in abundance; from larvæ in shoots of furze and *Genista anglica*; from Wanstead. *Parasias lappella*: from seed-heads of *Arctium lappa* collected in April; they emerged in July in scores; they change to pupæ in the seed-head; these I got in the Warren,

Folkestone. *Anarsia spartiella*: a long series from larvæ on furze; Wanstead. *Hypercallia christiannella*: fine specimens from larvæ collected near Sevenoaks. *Argyresthia pygmælla*; freely from catkins and shoots of sallow; from Greenhithe. *Coleophora genistæcolella*: larva abundantly in many parts of Epping Forest, wherever its food (*Genista anglica*) grows. *C. saturatella*: a long series from larvæ on broom; Wanstead Flats. *C. virgaureella*: in abundance from larvæ on golden-rod; Sevenoaks. *C. juncicolella*: a few specimens from larvæ swept at Shirley Hills, in March and April. *C. hemerobiella*: a long series from larvæ feeding on whitethorn; near Woodford; pear and plum is given as its food, but I have never found it on those trees, although I have repeatedly searched in many localities for it. *C. albitarsella*: freely bred from larvæ found on ground-ivy in lanes about Woodford. *C. alcyonipennella*: from larvæ on *Centaurea nigra*; Box Hill. *C. bicolorella*: a long series from larvæ on nut; Hackney marshes. *C. viminetella*: in abundance from larvæ on sallow; Hackney Marshes: also *Cosmopteryx Drurella* from same locality; larvæ feeding in hop leaves. *Cemiostoma scitella*: freely from larvæ mining leaves of whitethorn; lanes about Loughton. *Elachista megerlella*: from larvæ in leaves of *Dactylus glomerata*; a long series; Hackney Marshes. *E. gangabella*: captured a few specimens in a sheltered corner in one of the hollows in the Forest, near Woodford; I hope to be able to find the larva this spring, now I know a locality. I have also bred *S. pasivana* (*sinuana*) rather freely the last two seasons, from larvæ feeding in the flowers of *Chrysanthemum leucanthemum*; they draw two or three of the florets together, which is a sure indication of their presence; various parts of Kent and Surrey.—GEORGE ELISHA; 122, Shepherdess Walk, City Road, N.

COLEOPTERA IN 1878.—As far as my observations go, the year just passed was by no means a good one for collecting. Owing to the cold wet spring, the sallow and whitethorn blossom was almost entirely lost, while the superabundance of rank grass and herbage throughout the summer prevented the sweeping-net being used at all profitably. Many species which I took in abundance in 1877 were exceedingly scarce, particularly among *Geodephaga*. *Brachinus crepitans*, however, was an exception, and occurred to me under singular circumstances. Having threshed some wheat in bad condition, I had it exposed to the sun on a sail-cloth.

Each morning when the covering was removed, Bombardiers by the dozen scampered down the sides of the heap. Hitherto I had only taken it sparingly, so that finding it in abundance corresponds with the remarks of Mr. Hopkins (Entom. xi. 256). I suppose the warmth generated by the damp wheat was the source of attraction. With it was *Anthicus floralis*, equally abundant, and a few Staphs. Although the aggregate of beetles taken during the year was comparatively small, somewhat over five hundred and fifty species (exclusive of *Brachelytra*) were represented, among which the following may be worthy of passing notice:—*Polystichus vittatus*, *Dromius quadrisignatus*, *Badister peltatus*, *Cryptarcha imperialis*, *Cryptophagus populi*, *Mycetophagus quadriguttatus*, *Dermestes Frischi*, *Aphodius lividus*, *Drilus flavescens*, male and female (previously recorded), *Telpehorus figuratus*, *Cionus thapsus*, *Sibynes primitus*, *Magdalinus barbicornis*, *Molytes germanus* (Mr. Jeffery and I came upon a colony of these monsters feeding upon *Heracleum* in a sandy wood), *Trachyphlæus alternans*, *Otiorhynchus fuscipes*, *Brachytarsus scabrosus*, *Zeugophora flavicollis*, *Cryptocephalus sexpunctatus*, *Conopalpus testaceus*. I am indebted to Mr. Champion and the Rev. W. W. Fowler for naming several, and removing my doubts respecting many more of my captures.—THOMAS H. HART; Kingsnorth, January 7, 1879.

MICROGASTER FROM PIERIS RAPÆ.—Last summer I bred a large number of these little ichneumons from the cocoons given me by Mr. W. C. Boyd (see Entom. x. 302, note). The larger stigma shows it to be a different species to the *Brassicæ*-feeding *Apanteles glomeratus*. I failed to find a name for it with the help of Haliday's papers in the second volume of the Entomological Magazine, so applied to Mr. F. Smith; but there being none of Haliday's types of *Microgaster* in the Museum, he quite declined to attack Ruthe's lot. Mr. Foran, of Eastbourne, sent me some of these cocoons which were evolved from a *P. rapæ* larva on September 3rd last.—EDWARD A. FITCH; Maldon, Essex.

DRYOPHANTA SCUTELLARIUS.—In walking through Cannwood in November last, I was struck with the size of some of the oak-galls on the under side of the fallen leaves. I filled a pocket with them, and on my return sent a few to Mr. E. A. Fitch, who pronounced them to be the gall of *Dryophanta scutellarius*, and

above the average in size. At the beginning of this month the imagos began to appear, and still continue to do so. My object in writing this note is to ask this question: How is the time passed until the imago can again deposit its eggs on the under side of the leaf? The leaf must, I think, be mature before it is deposited, or so large a gall would surely distort it.—G. C. BIGNELL; Stonehouse, Plymouth, January 16, 1879.

YORKSHIRE NATURALISTS' UNION.—At a meeting of the Entomological section of the Yorkshire Naturalists' Union held at Leeds on the 11th January, it was decided to publish a list with localities of the Lepidoptera of the county of Yorkshire. Its compilation was placed in the hands of Mr. W. Prest, of York, and myself. May I ask, therefore, that every lepidopterist who has collected in any part of Yorkshire, however little, will kindly send to me list with localities (and in the case of rare or unusual species, with *dates*), of all the species noticed, with any notes that may be of use, as early as convenient. I need scarcely say that all such assistance shall be fully acknowledged.—GEORGE T. PORRITT; Highroyd House, Huddersfield.

OBITUARY.

E. C. BUXTON.—About fifteen years ago there lived at Daresbury Hall, near Warrington, Mr. E. C. Buxton, a gentleman known to his friends as a genial companion, an ardent sportsman, and a keen lepidopterist. Although not his first collection of Lepidoptera (which was destroyed by fire at Walton-on-the-Naze), he then possessed one of the finest in England. Collecting assiduously himself, he also employed collectors to visit many distant parts of Britain in search of rarities. Mr. J. B. Hodgkinson says, "How well I remember his visits to me, fully thirty years ago, when making his second collection; and his telling me how pleased he was on finding a specimen of *Pieris Daplidice* at rest on a flower." He was one of those indefatigable collectors and sportsmen who prided himself upon his great catches, whether of insects, salmon, or wildfowl. Eventually finding his British collection becoming as complete as he could well make it, he devoted himself to foreign travel, and the study of African butterflies and birds. With this object he went to Port Natal, where he collected large numbers of insects.

Many of his rarities were presented to the British Museum, and were described by Mr. A. G. Butler, with coloured plates, in the 'Transactions of the Zoological Society.' Subsequent to his visit to Natal, he went to Sumatra, where ornithological studies occupied much of his time, and the new species he added to Science were described by the late Marquis of Tweeddale in the 'Ibis' of 1877. We believe that in all he made three journeys to Africa; his last voyage was to Zanzibar, where he again collected birds, but only for a short time, since he imprudently and contrary to advice would go out in quest of insects, &c., at night. This, as he had been warned would be the case, brought on an attack of fever which caused his death, a few months ago, at the age of sixty-seven years. He was buried on the banks of the River Niger by Bishop Crowther. His large collection of British Lepidoptera was bought by Mr. King, of Portland Road, some few years ago, and by him distributed to many purchasers. When salmon-fishing in the north of Scotland, Mr. Buxton used to capture many insects peculiar to the locality, such as *Boarmia cinctaria*, *Lobophora hexapterata* (the latter in large numbers), and the almost unique *Röslerstammia pronubella*; while he found *Scopula decrepitalis* in plenty. Nothing used to give him greater pleasure than the distribution of these specimens amongst his friends, of whom his generosity made many. We are indebted to Messrs. Frederick Smith and J. B. Hodgkinson for many of the above facts.—J. T. C.

N. C. TUELY, F.L.S.—We regret to have to record the death of this gentleman, which took place at his residence, Wimbledon Park, on January 3rd. Mr. Tuely was in his forty-sixth year. He was a general lepidopterist; and has been an occasional contributor to the 'Entomologist' from the commencement.—ED.

WILLIAM GOOSEY.—It is with deep regret I have to record the death of Mr. William Goosey, at Stepney, after a short illness, on the 20th December, 1878, aged seventy-four years. During his life, all the time he could spare from his business as a chemist was devoted to the study of Natural History, especially Entomology and Botany, of which latter science he was passionately fond. He has been a member of the East London Entomological Society since its formation, and by his death it loses a most useful and generous member.—D. PRATT.

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[No. 190.]

NOTES ON ACIDALIA CONTIGUARIA.

By HERBERT FORTESCUE FRYER.



ACIDALIA CONTIGUARIA (dark and pale varieties).

IN July, 1876, through the kindness of Mr. Capper, who showed me the locality in North Wales, I was enabled to take a few specimens of *Acidalia contiguaria*. I found it by no means common, even in its own peculiar and apparently somewhat restricted locality, though I searched assiduously and was assisted by Mr. Capper's sons, most indefatigable workers. From the imagines I took I obtained a few eggs, but as it was somewhat late in the season the larvæ hybernated, and though they all went into pupa in the spring I was not successful in breeding them.

The following year I obtained eggs from the same place, where I again had the pleasure of meeting Mr. Capper, who was collecting in the old spot. We both agreed that *A. contiguaria* ought to occur in other parts of North Wales—in fact, wherever the necessary conditions of food-plant, shelter, &c., were to be found.

Shortly afterwards, when staying a few days at Bettws-y-coed, I went out to look for *Contiguaria*, and at some considerable elevation I took what I afterwards found to be the dark variety, though so different was it from the light bone-coloured form,

which occurs at Llanfairfechan, that at the time I did not recognise it as the same species. It is a most difficult insect to detect, as it mimics very closely (as indeed also does the light variety) the rock on which it rests. The variety occurring at Bettws-y-coed is a somewhat larger insect, and is very much suffused with dark grey or black, and is, I find, remarked upon by Guenée, who says in his 'Histoire Naturelle,' vol. ix. p. 464, "Quelques individus sont de gris-cendre, d'autres, et ce sont les plus ordinaires, d'une couleur d'os un peu jaunâtres, avec les franges un peu plus rougeâtres. Une femelle prise dans la Lozère par M. Bellier, est presque'entièrement envahie par des atomes noirs, comme certaines variétés de *Bisetata*."

It occurs at Bettws at a greater elevation than at Llanfairfechan, and on one of those Welsh hills where high winds, with heavy rains, and cold misty days seem to be alternate states of weather. I do not know whether these ungenial climatal conditions be the cause, but this darker form seems to me to be a more robust (if the term be admissable) type of insect attaining in certain individuals, and possibly averaging, a greater linear expansion than its light-coloured relative.

I have now bred some three or four generations of each variety, and have been surprised to find how true each keeps to the parent type.*

Some little time ago I wrote upon the subject to the Rev. J. Hellins, sending him specimens of each, and stating the main facts, viz., that each variety, as far as my experience and that of Mr. Capper went, was confined to its own locality; that the successive generations of each were true to the parent form; that, on the contrary, though differing *inter se* as some of the *Acidalie* do, I could see no specific difference. Mr. Hellins wrote to me, saying, that unless some recognisable difference could be detected in the egg or larva state, he should consider them merely varieties of one species, and he suggested I should forward larvæ to Mr. Buckler. This I did, and I believe they do not differ from the larva of *A. contiguaria*, as described by him (E. M. M. iii., 69).

* Mr. Sidebotham, who has successfully bred this species for the last year or two, tells me he occasionally gets a darker-coloured brood. If now we may look upon this as a "reversion," it tends to bear out the hypothesis that the darker is the original form.

In a case of variation of this kind it is natural to inquire how far the facts are in accordance with the theories of "selection" and protective resemblance or mimicry, or more generally of "the adaptation of the organism to its environment." An interesting question thus arises as to how far this difference in colour may be due to climate, height above sea-level, and more sombre colour of surrounding rocks. Thus we have Llanfair-fechan—a sheltered habitat; on the sea coast (which generally infers a more equable temperature during the year); and light-coloured rocks, producing a light bone-coloured type. And Bettws-y-coed—a habitat at a greater elevation—much subject to high winds, rain and chill misty days, and with rocks of a darker hue and somewhat shaded with dark rust-coloured grey, producing a darker form.

Is the difference in these conditions sufficiently marked to account for a tendency towards Melanochroism? Or may we not conclude (from its greater pilosity and resemblance to an Arctic type) the darker variety to be the older or original type (possibly a survival from the Glacial period), and the light to be the aberrant form; and that the species originating inland and extending into a locality where the surroundings were of lighter hue, and which received a greater amount of sunshine throughout the year, accommodated itself to these new conditions, and gradually acquired, possibly for the sake of protection, the lighter tone of the rocks of its new locality?

Chatteris, January, 1879.

ATTACUS ATLAS: A LIFE-HISTORY.

BY PHILIP HENRY GOSSE, F.R.S.

(Concluded from p. 41.)

It was now past the middle of September; the weather set in windy and cold; I had not yet begun domestic fires; I therefore removed the whole ménage to an orchid-house, where there was a hot damp atmosphere, probably much like that of the Indian valleys whence the parents came. In one or other of my tropical plant-houses it remained thenceforth, save that, now and then, on a warm sunny day, when I wished to have the larvæ under closer observation, I replaced it for a few hours in my study.

On the 25th of September, several passed into the 5th age. One of these I detected at the very instant of beginning its moult. The first rupture of the old skin was certainly not on the back, but across the breast of the prothorax, extending backwards by a lateral rent on each side. The new face was early freed, and carried the old face on the lip and jaws, to be removed only by rubbing against surrounding objects, when the body was two-thirds denuded. The skin drags upon the dorsal region long after the sides: the long declined tubercles seem difficult of liberation.

The head appeared very small for the 5th age of so gigantic a moth; and so, indeed, did the whole larva. As the old skin was pushed off in folds, the farina flew about on the currents of air in the room, like the finest flour, and accumulated in little heaps on the leaves below. In general, these tiny heaps of dust are the only remains left where a moult has occurred; for the larva evidently devours its own exuviae. I wished to witness this operation; but, in neither of the moults that had occurred under my eye did the larva, after his labours, take any notice of the exuviae. Nor did this one for a while; but, by-and-by, he turned his head round slowly, and began to munch the exuviae, holding it up bodily in his mouth, till two-thirds were gone, when, the residue falling to the ground, he took no trouble to go down the twig to look for it.

LARVA.—5th age.

The ground-colour is now a pale yellowish green, or green-white; face and lip the same; clypeus edged by a black line, forming a conspicuous triangle; jaws black. Pre-anal plate, and posterior edges of the last prolegs, bright mazarine-blue, studded with the usual skin-cellules (glands?) which are here blue-black. Tubercles tinted with azure at their tips; the lowest series on the first five segments slenderer than the rest, of deep indigo hue. Feet, prolegs, and edges of all the segments, tinted with azure; two black bands surround each proleg, of which one is marginal; hindmost proleg painted with a broad ring of light scarlet, inclosing an azure area, as in the 4th age. Five days after this moult, the larva, when resting contracted to one inch and three-fourths in length, is half an inch in vertical height at the middle, and one-third of an inch in transverse diameter. Crawling it extends to two and a half inches. There is an increased tendency to raise the tubercles from their imbricate recumbent position; especially in crawling, when they are nearly erected. The waxy

farina is now considerably diminished; it is still excreted, but in smaller quantity. Hence the forms and dimensions, and even the minute spines, of the tubercles, are now plainly seen; as are also the oval dark spots which crowd the entire skin, which I suppose to be the glands that secrete this flour-like substance.

One of the larvæ of this age dying, I desired to inflate it for the cabinet; and, as a preparatory measure, dropped it into a sat. sol. alum. The body floated half immersed; but, at the instant of touching the water, this waxy farina spread on the surface to the distance of one-sixth of an inch around the body, forming a pellicle; and this substance on the larva keeps it from becoming wet, like a duck's feathers.

No farina is excreted till some time after moulting. At first the tubercles are seen to be polished on their surfaces, and to be beset with very fine and short spines, not arranged in whorls. The upper and middle tubercles of the thoracic segments are aborted in this age, leaving only rugose scars.

One cannot fail to remark the resemblance between the larva of *Atlas* and that of *Cynthia*. There is the same whitish-green hue on the upper parts, becoming yellow-green on the lower; the same tendency to azure at each extremity; the same soft styli-form tubercles, which also are azure; the same minute oval glands studding the skin; and the same clothing of white waxy farina; which, in both species, becomes conspicuous in the third age, and is obsolescent in the latter part of the fifth. *Atlas* is of more clumsy shape, lacking the elegant fusiform outline of its congener: it has not the yellow extremities, nor the black specks on the sides, of *Cynthia*: but then *Cynthia* has no such ornament as the beautiful pale scarlet ring on each hindmost proleg of *Atlas*. Yet another point of agreement is the smallness of the head in these, compared with the same organ in the 5th age of such larvæ of *Antherææ* as I am familiar with, as *Yama-mai* and *Pernyi*. The propriety of Hübner's separation of *Antherææ* from *Attacus*, which had seemed slight when grounded on the imago only, is much confirmed by the consideration of the previous stages.

At the beginning of October my stock was reduced to five; but all had been some time in the 5th age, and I began to look for the spinning of cocoons. I had assumed the successive ages of the larvæ, throughout the Lepidoptera, to be limited to five. But, to my astonishment, I saw that the most advanced was

preparing for another moult, which, after four days' torpidity, was completed during the night of the 7th. I had carefully recorded all the moults, so that there seemed no possibility of error, though to me the fact appeared without precedent.*

LARVA.—6th age. (Fig. d.)

The ground-colour is now a delicate, soft pea-green, which towards the back becomes more and more white, owing to an exceedingly fine coating of the farina. The pre-anal shield is flat, thick, and horizontally extended; it is tinged with blue. All the tubercles have the form of short, soft, slender spines, beset very sparsely with minute spiculæ. These organs are of a lively azure hue, which is concealed to some extent by a coarser exudation of the farina, which clogs irregularly about them, like damp flour. The two upper tubercles on the eleventh segment are, as usual, united into one, thick, and medially placed. The middle one on the same segment is reduced to a mere wart: the lowest is normal. The prothoracic tubercles are azure, as all the rest, but are tipped with shining blue-black; the upper and middle meso- and metathoracic tubercles appear as if cut off just above their bases, each leaving a sort of wrinkled scar, of azure hue. Feet azure; the terminal joint polished black, whence a black line runs up in front of the higher joints. Prolegs azure, crossed by two bands of polished black, and terminated by a soft margin of pellucid purplish green, which carries the clinging hooks: the space between the two black bands is azure, and this space is set, at the lower margin, with a row of fine short white bristles, curving downward. The hindmost bear, each on its upper and outer portion, the usual triangular mark, which in this case is sub-

* The variation, however, is not so unprecedented as I at first supposed. Porter (Silk-manufact., p. 120) speaks of a var. of *Bombyx mori*, "which casts its skin only thrice;" and Capt. Hutton (Trans. Ent. Soc., 3rd ser., p. 299) refers to the same, which, however (p. 311), he considers a distinct species. Both refer to Count Dandolo, as their authority for the fact. M. Bavier (La Sericicult. au Japon., p. 8) says, "Les vers japonais traversent les quatre mues, à l'exception d'une race . . . qui file le cocon au bout de la troisième mue."

Burmeister (Man. Entom.; Shuckard's transl., p. 431) observes that the caterpillars of some of the larger moths moult very frequently: "for instance, *Arctia villica*, from five to eight times; *A. dominula*, nine times; and *A. caca* ten times."

In the case of my *Atlas* larvæ, as I had but one that attained this maturity, I might have supposed it accidental and abnormal. But a gentleman, who also has essayed the rearing of this species from larvæ of the same brood as my own,—Mr. Thomas Edmonds, of Bedford Row,—confirms my experience. He observes, "I feel sure that mine have moulted five times, and are in their 6th age, as yours are." Mr. Edmonds mentions that he has reared two broods of *Samia Prometheus*, of both of which the larvæ moulted three times only. On the contrary, my own experience of *Promethea* gives them the ordinary number of four moults.

quadrantic, wide, and of a lovely light scarlet, or miniate, hue, the inclosed area being azure.

The spiracles are rather large, ovate, and of the same azure hue. The pro-thoracic segment has its front edge now quite smooth; whereas in the previous ages it carried four protuberant teeth, the progressive obliteration of which well marks the successive ages; for, so late as the 3rd age, these are long (as long as the tubercles), flexible and tentaculoid; in the 4th, much reduced, but still tooth-like; in the 5th, mere blue knobs; and in the 6th, wholly obliterated, or recognisable only as a slight transverse ridge just behind the collar-edge. The head is of the common light-green hue, polished, the clypeus marked by a triangular black line; the ocular patch black; lip and palpi azure; jaws black. A streak of shining black, on each cheek, is visible when the head is protruded, as in eating or crawling.

The whole skin of the upper parts, down to the line of the spiracles, is studded with those curious specks, which I suppose to be glands, more or less round, dark pellucid olive in hue, most conspicuous on the thoracic region, where they are occasionally confluent. Their surface is everywhere level with the skin, save around the edge of the pre-anal shield, where they become tiny conical warts, of a blue-black hue. The tubercles of the abdominal segments, in repose, lie flat, pointing backward and overlapping; so as, in their aggregate, to convey the impression of four bluish-white thick keels, or longitudinal ridges, along the body. In the extension of the body for crawling, they are slightly elevated, and then reveal their true character.

The four caterpillars remaining of the fifth age, now suddenly died; all of a disease of the bowels, the fæces becoming soft, clogging the margin of the rectum, and ultimately changing to a brown fluid. The solitary survivor of so numerous a family continued a fortnight longer, apparently prospering, and attaining the size and beauty which I have sought to represent in the plate, fig. *d.*; after a time, however, eating less and less, and diminishing in size. My willow tree was fast denuding; the leaves grew less attractive, less nutritive,—perhaps even unwholesome. At length, on the 20th of October, I was dismayed by observing the familiar symptoms of incipient diarrhœa, in the softened clogging fæces. I had just been reading Dr. Le Doux's valuable Memoir (Bull. Soc. Acclim., Aug. 1878) “De l'influence de Quinquina sur les Vers à soie.” I immediately applied Quinine to my little patient, bedewing it, *and its food-leaves*, with a very weak solution. I was gratified by seeing that it presently began to eat; that it ate freely, necessarily receiving a minute amount of the drug into the

stomach, as well as into the skin; that the fæces were discharged in pellets, and became firmer. The ominous symptoms I have often seen in other species, as well as this; and I have invariably found that they have run to a fatal termination in twenty-four hours. My *Atlas*, indeed, died; but he survived these symptoms seven days, during which they certainly did not grow worse, but better; so that, *qu. val.*, my experience confirms the value of quinine in this terrible disease of our silkworms. On the last day of its life, my caterpillar both ate and crawled on his plant; but, on the morning of the 27th of October, I found him fallen to the ground, much shrunken, a drop of brown fluid oozing from *the mouth*; but nothing abnormal about the anus. The medicine surely arrested this; it did not preserve life, but I think it prolonged it.

COCOON AND PUPA.

My cultural experiment fell short of the desired result; but, as I began it with imported living cocoons, its cycle is almost complete. The Cocoon of *Atlas* (fig. *f.*) is often rudely bag-shaped, but sometimes long spindle-shaped, like that of *Cynthia*, running up above, however, into a slender cord, which embraces the footstalk of a leaf, and below dilating into a thin lamina of silk, which is spread over the surface of a leaf. Its form is in some measure determined by the concavity of several leaves drawn together, to the internal surfaces of which the Cocoon adheres. When it is wholly spun, the leaves can be readily stripped away, leaving a permanent impression of their form and neuration on the silk.

The Cocoon, omitting the cord and the lamina at the extremities, is from two to three inches in length, and about one inch in greatest width. Its colour is a light umber, or drab; its surface (independently of the impress of leaves) roughly granular, scarcely at all silky or floccose, except at the mouth; its substance thin, parchmenty, very firm; the interior very smooth, and even sub-glossy. The upper extremity forms a natural orifice for the exit of the moth, made by the convergence of a great number of silk-fibres, which are left ungummed, and are thus soft and flossy; the gummed stiff silk passing up on one side, and contracting into the cord. Thus the cocoon is not *closed*, like those of *Bombyx mori*, of *Telea*, of the *Antherææ*; but open, like those of *A. Cynthia*, of the *Samia*, of the *Saturniæ*.* As a result of this structure, the exit of the imago leaves no disturbance behind, no wetness, no disarrangement of these soft fibres, such as is the case with *Yama-mai*, *Pernyi*, and *Mylitta*.

* Viz., of *S. pyri*, and *S. spini*; and also of our own *S. carpinii*,—save that the second converging dome-fibres of the last-named seem peculiar to this species.

The Pupa (fig. *e*) is not much longer than that of *Yama*; but it is much more bulky. My specimens measure as follows:—

	Male.	Female.
Length - - - - -	1·20 inch.	1·35 inch.
Breadth (from side to side) -	0·65 „	0·72 „
Depth (from back to front) -	0·70 „	0·82 „

In both sexes the wing-covers are very great; the superior are falcate in both; the inferior notably project. In the male the antennæ-covers are 0·35 inch broad; the pectination distinctly marked. The abdomen terminates in a short papilliform tail. The general hue is a bright chestnut, darker on the abdomen.

Looking back on the eighty larvæ which had been under my unremitting and most watchful care since the beginning of August, *with this result*, I strive to discover the cause of failure. It is not invariable. I know of only two English attempts besides my own. Mr. Edmonds began with twenty-four ova, all of which hatched, and almost all did well till the 6th age, when all died of dysentery, about the same time as my own. On the other hand, Captain Lendy, of Surbiton, beginning with twenty-four ova (of the same lot), has obtained fifteen good cocoons. This gentleman's experience is, then, of great value.

The lateness of the season at which the larvæ appear is, doubtless, the main difficulty: the increasing cold protracting the larval existence, to the weakening and exhausting of the animal. Lady Gilbert's worms passed into cocoon within less than a month from the hatching: my own lingered for more than two months and a half; Mr. Edmonds's for three months. Captain Lendy informs me that he placed his new-born larvæ in a plant-stove, in which the temperature ranged from 65° at night to 85° or even 90° by day; *and he obtained cocoons within a month from hatching*.

This points, as I judge, not to the use of artificial heat, as essential to success in England, but to a summer, rather than an autumn life. I have just obtained some imported cocoons, which I shall winter in a warm room, in hope to evolve imagines in spring; and so get ova in May, and larvæ in June, if possible,

I do not think the kind of food-plant is of vital importance. Captain Lendy is confident that the common berberry is the only proper food. Mr. Edmonds fed his with plum. Lady Gilbert extols apple. Mine chose sallow for themselves. All the *Saturniadæ* seem to be very polyphagous. Whether the frequent

dew of the worms with fine spray was useful or hurtful I am not sure. I recollected the excessively humid atmosphere of the mountain-forests of India; and, considering that in my room they never felt a drop of rain or dew, it seemed that occasional aspersions were an approach to natural conditions, which might be grateful. Captain Lendy never aspersed his; but then his plant-house was doubtless damp. If I obtain sufficient larvæ in the coming summer, I purpose to attempt culture in the open air, on the common berberry, and other trees, surrounding a large branch on which the larvæ are placed, with blonde or gauze, to protect them from birds.

It may not be wholly irrelevant to add that I have already in my possession a considerable number of living pupæ in cocoon, of two other noble Indian species, viz., *Caligula Simla*, and *Antheræa Roylei*, neither of which has, so far as I know, been yet reared in Europe. The food of neither is known; but the cocoons of the latter, which are of large dimensions, are closely enveloped in leathery leaves, which Sir Joseph D. Hooker assures me are those of "*Quercus incana*, a tree which grows along almost the whole length of the Himalaya, at elevations of 5000 to 8000 feet, from the Indus to Nepâl. It does not, however, extend eastwards into Sikkim or Bhotan; nor does it descend into the plains." I gladly publish this valuable information from such a source, because others will be raising *Roylei* as well as I; and, judging from experience of other oak-eating species, we may now very confidently present to the larvæ the leaves of the English and Turkey oaks.

Whether the silk of these species and of *Atlas* will ever be of any commercial value in this country I do not know. My interest in them is that of a naturalist, rather than that of an economist; and in that capacity I venture to present these notes to the readers of the 'Entomologist.'

POSTSCRIPT.—Since the preceding article was in type, I have seen a valuable Memoir, by Dr. Chavannes, of Lausanne, "On Silk-spinning *Saturniæ* desirable to be introduced into France" ('Bullet. de la Soc. d'Acclim.,' July, 1855). In a short paragraph on *Atlas*, he says:—"The silk is stronger and thicker than that of *Aurota* [which he had just praised, as far exceeding, in these respects, that of *B. mori*]; and could probably be wound to

a single thread (à un seul brin), like that of *Mylytta*. Though less rich, the cocoon of *Atlas* would yield almost as much silk as this last. The worm is the *Fagara* of China, where it has been long cultivated. . . . *Mylytta*, *Atlas*, and *Mimosa* commend themselves by the great quantity of silk which they furnish."

I hasten also to correct an error, in the earlier part of this Memoir (p. 29), by information just received from Mr. Watkins. He says:—"In January, 1876, I received about twenty cocoons each of *Attacus Atlas* and *Actias Selene*. Two of these were purchased by Leonard Marshall, Esq., who obtained, in March, 1876, a female *Atlas* moth, which is now in his possession. During the same spring I bred the remainder; but only one pair was evolved at one time, which yielded eggs that were never hatched."

EXPLANATION OF THE PLATE.

Fig. a.—Eggs of *Attacus Atlas*.

Fig. d.—Larva in sixth age.

Fig. b.—Larva in first age.

Fig. e.—Pupa.

Fig. c.—Larva in fourth age.

Fig. f.—Cocoon.

(All of natural size.)

A LEPIDOPTERIST'S GUIDE TO LYN DHURST.

By B. LOCKYER.

I VENTURE to give a few hints which, read by the light of the Ordnance Survey Maps (sold in sheets at six inches to the mile, 2s. 6d. per sheet, by Mr. Stanford, of Charing Cross) will, I trust, be found a tolerably useful guide to the macro-lepidopterist studying the fauna of this district in the New Forest. The sheets which contain the localities named in the following notes are:—No. lxiv. (district between the Southampton Road and Minstead), No. lxxi. (district between the Ringwood and Christchurch Roads), and No. lxxii (district extending from Lyndhurst to Brockenhurst Bridge and including Park Hill inclosure, &c.). Wilverley and the other large inclosures south of it are contained in sheet No. lxxix.

We will start from the eastern corner of the Northern or Minstead Road, and, taking the Southampton Road first and walking past the Beaulieu Road (the second turning on the right),

we shall find the extensive undulating heathy tract known as Matley Heath, extending a mile or so south-east along the Beaulieu Road to the railway, and intersected about a mile and three-quarters from the cross roads by Matley Rog, a running stream bordered by marshy ground, abounding, like all the numerous boggy tracts in the forest, with the fragrant *Myrica Gale* and other marsh plants, and fringed all along its course with thick alder bushes. There are some very fine willow bushes about here, but they are almost, if not quite, inaccessible.

These peat bogs are the favourite resorts of *Acidalia emutaria*, *Melanthia rubiginata*, *Leucania pudorina*, and other species, which may be taken on the wing at dusk by forming standing ground on the peat with the cut "turfs" which are nearly always to be found lying about the heaths. But, of course, a look-out must be kept for the "natives," many of whom are often oblivious of the law of assault, and might not see the matter in the same light as the collector eager to capture *Acidalia emutaria*.

The heath itself, in July, swarms with *Lycæna Ægon*, and later on *Satyrus Semele* is equally abundant. I have taken *Selidosema plumaria* here, which is, like most *Geometræ*, easily disturbed by day, and does not usually fly far or high till thoroughly scared; and am informed that *Gnophos obscurata* occurs, but after devoting a whole afternoon to the endeavour to dislodge it from the heather and gorse, returned with empty boxes, as far as this species was concerned.

Returning to the high road, after passing the last cottages on the left hand, you will arrive at the entrance to the Race-course—a small tract of heath enclosed to the north by an alder carr and peat bog forming part of "Beaulieu River." This is the great breeding-ground for *Selidosema plumaria*, and in 1873 I easily captured several dozens in two days, in lovely condition, and could have taken many more had space and time permitted. Here also may be captured *Heliothis dipsacea*, which offers by no means bad sport, as it flies with great rapidity and takes to sudden disappearances, which keep the naturalist thoroughly on the *qui vive*. Here in the spring the larvæ of many *Noctuæ* and *Geometræ* can be swept in abundance by night in favourable weather. About half-a-mile farther on you reach an enclosure of good-sized oaks. This is Lodge Hill (commonly called Lightfoots), and till 1871 as good a sugaring-ground as any near Lyndhurst. I have seen

half-a-dozen *Catocala sponsa* on one tree here: *Triphæna subsequa*, *Agrotis saucia*, and other *Noctuæ* too numerous to mention, were also taken. *Limenitis Sibylla* may be seen here, but I never found it very common. In Ashurst Wood, on the opposite side of the way, and also in Denny Wood, the next locality to which I shall ask you to accompany me, *Liparis monacha* is a conspicuous object at rest on the trunks of oak trees in July and August.

Our next day's excursion may begin by following the Beaulieu Road for a mile and three-quarters, through Matley Heath; leaving Pond Head on the right, you arrive at a path on the left, running between sandy banks and leading to a conspicuous clump of oaks and beeches, overshadowing fine holly bushes situated on rising ground: opposite this (Matley Wood) a path bordered by scattered oaks enters the road, beyond which is a sloping tract covered as far as the eye can reach with spreading forest trees. This is Denny Wait, the entrance to Denny Wood, a fine expanse of forest rather more than a mile in length, extending south to Denny Bog and Denny Lodge enclosure. *Senecio jacobæa* grows luxuriantly here. Follow the path straight down to the second cross-path, where there is a small tract of heather surrounded on all sides by the wood. All this is very productive collecting-ground in favourable seasons.

A list of all the species which may be captured here would be tedious to wade through, but I may mention that there are some small clumps of sallow along the edge of the recently enclosed part of the wood (near Park Hill Wood), on the catkins of which, *Tæniocampa gracilis*, *T. miniosa* (the larvæ of which may be beaten commonly in June), *Hoporina croceago*, &c., have been taken in the spring; that *Lithosia quadra* and *L. helveola* can be taken as larvæ along with *Cleora lichenaria* and *C. glabraria* (the two first-named insects come to sugar in July); that *Chærocampa porcellus*, *Petasia cassinea*, *Notodonta trepida*, *N. chaonia* and *Diphthera Orion* have also occurred; that *Lithosia mesomella* and *Agrotis porphyrea* frequent the patches of heather in different parts of the wood; and that I found *Melanthia albicillata* commoner here than in any of the other woods where I captured it. There are some large patches of bramble at the end of the cross-path to the right (close to the small enclosure called Little Holm Hill), round which I used to take it flitting gently, every

evening at dusk. Far from these it seldom, if ever, strayed. *Leucania turca*, *Nola strigula*, *Epunda nigra*, *Xanthia aurago*, and *Hadena contigua* are among the species to be taken at sugar; and *Calligenia miniata* is common about Little Holm Hill. I once took in this wood a solitary specimen of *Minoa euphorbiata*. Among the heather and furze in and about the newly enclosed part you may look out for *Chelonia plantaginis* and *C. villica*.

(To be continued.)

ORGYIA CÆNOSA.

By F. D. WHEELER.

I WAS interested by observing some time ago, in the 'Entomologist,' an article by Mr. T. Eedle on the disappearance of this species from Wicken Fen, shortly followed by a notice of its capture there this season by Mr. G. T. Porritt. Mr. Eedle attributes its scarcity to the floods of the winter 1875-6, in which I cannot agree with him; but before entering into these surmises, perhaps it may interest some collectors to whom the fens are "terra incognita," if I give a short sketch of my acquaintance with this insect.

I first visited Wicken Fen in 1872, when I had somehow acquired the notion that *Macrogaster arundinis* was a thing of the past, and *Orgyia cænosa* almost so. This was confirmed to some extent by the fen-men, who told me they could no longer obtain larvæ or pupæ of the latter, though the former was occasionally met with as an extreme rarity. That season I was not fortunate enough to secure either, but in 1873 I first formed acquaintance with both by means of the "attracting lamp,"—a method of collecting which for fen-work simply eclipses all others. *Cænosa* first occurred on July 25th, 1873, and on the night of July 28th, as many as ten specimens came to the lamp. In all, upwards of fifty fell to my net that season, all male, of course, though my friend Mr. W. H. B. Fletcher took one female at rest. They flew between about 11 p.m. and 2 a.m., greatly resembling *Liparis auriflua* on the wing, but with a softer flight, and were easily netted. Next year (1874) I was staying throughout the months of July and August within six miles of Wicken Fen, and visited the ground regularly every other night. The weather was

most favourable for collecting, and insects simply swarmed: to my great disappointment, however, *Cænosa* was not among the crowd—only four specimens came to the lamp. In 1875 my friend Mr. Richardson took my place at Wicken, working the ground with the utmost care, yet he succeeded in taking but eight *Cænosa*, and this has been about the average yearly catch since then.

Of the larvæ I have seen three only, all of which I found upon the sedge (*Cladium Mariscus*) which forms the chief growth, and indeed the “crop” of Wicken Fen. As far as I have been able to gather from the sedge-cutters, this seems to be its usual food-plant, though probably reed and other herbage may enter into the category.

Before generalizing from these facts, I should like to mention similar instances of two other species:—

Callimorpha dominula used to swarm at Wicken: on May 7th, 1873, Mr. Fletcher and I collected in a few hours five hundred and eighty-two larvæ, almost all from one patch of dwarf sallow, and could have taken hundreds more without stirring twenty yards—there must have been very many thousands in the square mile or so constituting Wicken Fen. The species is still there, but in very diminished numbers: the very next season, happening to want a few larvæ, I was quite five hours in collecting three dozen. I may mention that a good number of these *Dominula* were turned out at Ranworth Fen, in Norfolk, but do not appear to have thriven, for I never saw it there since.

Leucania phragmitidis was also abundant in 1873: we could have taken almost any number feeding on the flower-heads of various grasses, and in fact did secure fine series, showing a beautiful pink hue—far more so than Norfolk specimens. In 1874, however, the species was quite a rarity, and seems ever since to have been singularly scarce for so usually common a fen insect. All these facts tend to show that, from some cause or other, the winter of 1873-4 was especially fatal to some of the Wicken insects. According to theory it should have been very wet, with heavy floods, but in fact the reverse was the case. In 1872-3, Wicken was quite covered, the sallow-bushes alone standing above the expanse of floods, yet after this *Dominula* was so abundant, as I have narrated, more so I believe than has been the case for some years. The following winter was comparatively

free from floods, and the spring of 1874 peculiarly early and dry. On the whole I am inclined to attribute the falling off in *Cænosa* and other species to directly opposite causes. For many years Wicken Fen has been gradually becoming *dryer*, so much so that the sedge-crop now takes longer (I am informed) in coming to maturity than was once the case: may it not be this influence which, in stunting the luxuriance of the fen vegetation, is gradually rendering it unsuitable for the nourishment of the larvæ? It is not easy to find a good-sized reed (*Arundo Phragmites*) in the fen, except among those growing in the ditches, and this has a curious effect upon *Macrogaster arundinis*, which runs very small as compared with Yaxley specimens. I have seen one or two good-sized ones from Wicken, but most of them are exceedingly small, especially the females. It is interesting to find that this extraordinary insect does not appear to be decreasing in numbers: it is far from abundant, but I cannot learn that it ever was so at Wicken—certainly not in my recollection. It is, therefore, some comfort to think that although *Cænosa* be fast following in the steps of *Nonagria concolor*, we are at least likely to retain for this generation the most singular and interesting of the lepidopterous fauna of our fens.

Chester Place, Norwich, December, 1878.

A NEW MACRO-LEPIDOPTERA.

By J. H. THRELFALL.

NEPTICULA LAPPONICA, *Wocke*, A SPECIES NEW TO BRITAIN.

I sent a short time ago some *Nepticulæ*, which appeared strange, to Mr. Stainton for identification, and he has just returned them as *Nepticula lapponica*, *Wocke*. They are closely allied to *N. sorbi*, but “have the fascia less oblique, more yellow, and generally broader.” The larvæ feed in broad serpentine mines in birch, are light yellow in colour when full fed, and are to be found at the same time as *N. betulicolella*, viz., October 1st to 20th.

[*Nepticula lapponica* appears to be either a scarce or overlooked species on the Continent, for *Wocke* only records it from Lapland and Finland. This makes Mr. Threlfall's discovery especially interesting.—ED.]

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY.

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. XI. NYMPHALIDÆ.—NYMPHALINÆ.

(Species allied to EUNICA.)

WE have now reached an extensive series of genera, the greater number of which are exclusively confined to Tropical America, of which they are highly characteristic. The typical species of *Cybdelis* measure about an inch and a half in expanse, and the hind margin of the fore wings projects slightly below the tip, and is slightly concave below the projection. The hind wings are scalloped; the hind margin curving strongly outwards in the middle, and then sloping more or less towards the anal angle. The typical species, *C. Phæsyle*, is reddish brown, with the apical half of the fore wings black, marked inside with a white band on a rich purple ground, and more or less broken into spots; towards the tip are two more small white spots. *C. Muasylus*, the commonest species, is of a rich brown, with four white spots on the fore wings—two at the tip, and two larger ones slightly surrounded with lilac, one on the costa, and another above the hinder angle. The hind wings have a large white spot in the middle, broadly surrounded with lilac; and there are one or two reddish submarginal lines on the hinder half of the wing. I think it probable that several species which I placed in *Myscelia* in my Catalogue, but which Mr. Hewitson placed in *Cybdelis* (in which genus he also included *Eunica*) would come better with the present genus. I refer to *C. Campaspe* and allies, which much resemble the genus *Perisama* in the markings of the upper side, though the wings are denticulated; and the hind margin projects slightly below the tip of the fore wings. They are velvety black, with rich green or blue radiating basal stripes on the fore wings, at least in the cell, beyond which is a broken row of spots of the same colour. The outer half of the hind wings is also frequently remarked with a large spot or short band. The basal portion, at least, of the under side of the fore wings is marked with a rich crimson. The hind wings are light brown beneath, with a white dot in the middle; and some indistinct lines. *Cyclogramma Pandama* is an insect of similar

size, but the hind margin of the fore wings is nearly entire, and is slightly concave below the middle. It is brown, and the fore wings are marked with an orange band, running from the middle of the costa obliquely to the hinder angle; outside this, the wing is black, with a white spot towards the tip. The orange band is replaced by a reddish one beneath; and the red colour extends nearly to the base. The hind wings are brown, with a zigzag black line near the base, and two others towards the hind margin; between these are four black rings, placed two and two.

There is a small African genus, *Crenis*, which represents *Eunica*. They expand two inches, or a little more or less. The fore wings are rather long, which makes the hind margin somewhat oblique; and the hind wings are slightly scalloped. They are brown or tawny, with the costa and tip of the fore wings black; sometimes the upper side is uniform dark brown, or is shot with violet-purple. The under side of the hind wings has always a more or less conspicuous, though continuous and regular, row of small eyes, but otherwise differs considerably; thus, that of *C. Drusius* of South Africa (the smallest species) is marbled nearly as in an *Hipparchia*, with the eyes well marked; that of *C. Madagascariensis* is silvery grey, the eyes being hardly visible; and that of the beautiful violet *C. Amulia*, from West Africa, is orange yellow, with the eyes, and two broken transverse black lines nearer the base, bordered with bluish grey.

The large South American genus *Eunica* contains a number of species varying from one and a half to nearly three inches in expanse. They are nearly all brown or velvety black, often more or less suffused with blue, purple, or violet, sometimes on the fore wings only, sometimes on the hind wings only, and sometimes on both; or the colour may be confined either to the base or to the borders of the wings, and is sometimes confined to the male. Many species are spotted with white on the outer half of the fore wings; and *E. Margarita* differs from all the rest in being silvery white above, instead of brown or purple, with the tip broadly black, spotted with white, and a double row of marginal dark spots on the hind wings, the outer ones round, and the inner ones securiform. The outline of the wings is very various, but is generally dentated; and the tip of the fore wings is frequently truncated. The under side of the hind wings is

always marked with a row of eyes beyond the middle, but this varies very much in distinctness. Sometimes, as in *E. Pomona*, there is a long black eye with two bluish white pupils near the tip, and a smaller one with one pupil near the anal angle; in *E. Caresa* the eyes are represented merely by inconspicuous pale spots; and in *E. Margarita*, nothing is visible on the mottled brown surface but two or three white pupils. In some species, as in *E. Maia*, the pupils of the eyes are green. Still the eyes are always more or less visible, in spite of their variability, and the genus is easy to recognise.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LYCÆNA BÆTICA IN THE ISLE OF WIGHT.—I have a specimen of this butterfly which was taken either by my brother or myself near to Freshwater, on the 23rd August, 1878. We were in want of "Blues," and netted every one we saw. The specimen is a male, but is in bad preservation, owing partly to our not knowing its rarity.—C. D. SNELL; 56, Jeffrey's Road, Clapham, S.W., February 10, 1879.

[Mr. Snell has very kindly allowed me to inspect the specimen of *Lycæna Bætica* above adverted to, and has also written me a letter giving a more explicit account of its capture. The insect is common in South-eastern and South-central Europe, and in favourable seasons it is found moderately common on the northern coast of France and in the Channel Islands. Three specimens have been taken in Belgium, one at Louvain, one at Visé, and one at Namur. Two specimens only have hitherto been recorded as having been captured in England. The larva feeds in the pods of *Colutea arborescens*, the common pea, and and other *Leguminosæ*: my acquaintance with the species in a state of nature is slight. I took the insect on the right bank of the Rhine, close to the bridge at Coblenz; it was there in the month of August flying over a piece of waste ground sparsely clothed with vegetation consisting principally of *Ononis arvensis*, in the turgid legume of which plant I have no doubt the larvæ had fed. I am inclined to think that the species may in some sunny spots in our southern counties be a permanent resident; it should be sought for on banks with a slope to the south, where any species of the genus *Ononis* grows in profusion; it might

also be found on any leguminous plant which has a turgid legume,—*Genista anglica* for instance,—but I think the larva could not exist except on plants which have these swollen pods, as it feeds inside the legume. The species when on the wing might be easily passed over as a specimen of *Lycæna Icarus*, and it is to this cause that I attribute the fact that it often happens young collectors who capture nearly every species they see on the wing are often rewarded, as in the present instance, by taking a great rarity, which would have escaped the notice of an older entomologist, who had long since obtained a full series of common species.—J. JENNER WEIR.]

PROTECTIVE HABIT OF THE LYCÆNIDÆ.—It is a trite remark that butterflies not otherwise specially protected generally prefer to settle on objects, the coloration of which closely approaches their own. Last August, in the Chiltern Hills, I noticed *Lycæna Alexis* haunting by preference a very common white umbelliferous flower (which my ignorance of botany does not enable me to name), whose florets have small intervals between them, so that when seen from a little distance it has an ocellated appearance. When a blue settles on this flower and closes its wings their ocellated under surface becomes almost invisible, unless you see the insect move.—J. W. SLATER; 3, Bicester Road, Aylesbury.

ACRONYCTA ALNI AT TORQUAY.—While staying at Torquay in the middle of August of last year, I obtained a full-fed larva of *Acronycta alni*, but it was unfortunately killed with the beating-stick.—C. WINN; Aldin House, Slough.

CRYMODES EXULIS AND HADENA ASSIMILIS.—I should be glad if any person can throw light upon the identity or severance of the two above-named species. I do not profess to be a learned entomologist, nor wish in my note to enter upon the details of the appearance of these insects, of both of which I believe I possess a specimen. I suppose they are still assumed to be identical. Newman figures both (among those very beautiful illustrations, whose accuracy, as a rule, even suggests the very colouring of the creature in a way no other illustrations I ever saw have succeeded in doing), still he says he cannot distinguish them,—and yet his drawings are widely divergent; and the drawing named *Hadena assimilis* is very dissimilar from *Hadena adusta*, from which I believe it gets its specific name; whilst his

Crymodes exulis is very similar to *H. adusta*. I speak more of the general effect than details, and most of the outline, which in Newman's *H. assimilis* is of the proportions of *Cerigo cytherea*; next to which genus in some lists is classified, however, not *H. assimilis* of Newman, but *C. exulis*. I have but one specimen of each; but the one marked *Exulis* is of the shape of Newman's *Assimilis*, and I have it placed next to *Cerigo cytherea*, while the one I believe to be *Assimilis* is similar to *Adusta*; it is, however, a female, and lacks the bright red line conspicuous in the male, and which I have heard fades after a time, which also may account for Newman mentioning no such distinguishing stigma, whether in his description of *C. exulis* or of *H. assimilis*. In Scotland, last June, a very energetic and obliging collector pointed out to me the very tree on which two years ago he took a male *Assimilis* with the bright red line, at sugar: he said "you will probably take *Exulis* before you leave." Accordingly on July 9th, within fifty yards of the tree pointed out to me, at my sugar was captured a very beautiful moth, at first supposed to be *H. adusta*, apparently but just emerged; but at that time *Adusta* was quite over-worn. On careful daylight examination we came to the conclusion that it was a female *Assimilis*; and this has been decidedly pronounced to be the case by your well-known correspondent Mr. Hodgkinson, of Preston. As I said, I describe only its general appearance: and it appears to me to be a little smaller, narrower in the wings, and of a far richer and more velvety appearance than any *Adusta*; it is also darker than even the dark *Adusta* taken near Kinloch, Rannoch, which seem to me to be, as a rule, darker than those taken at Croiscrag, only eight miles off, near the other end of the lake. At sugar it sat with its head pointing up the tree, and its wings quite closed, which I believe not to be habits with *Adusta*. It was one out of seven insects taken at sugar during thirteen nights, the other six being *Triphæna pronuba*, *Hadena adusta*, *Rusina tenebrosa*, *Noctua plecta*, *N. conflua*, and *Hadena pisi*. On one occasion five collectors were out on the same night and did not see a moth. *Acronycta myricæ* was altogether absent there in 1878. This extraordinary record in the annals of sugaring I have been much surprised to find has been passed over with scarce notice in the magazines. I left Perthshire, July 15th, and I heard that there was no improvement in this matter during the season of *Aplecta*

occulta and *A. tincta*; although on my return to Lancashire my garden trees swarmed with moths at sugar, amongst which I took a black *Xylophasia polyodon*, almost as velvety as *H. assimilis*.—[Rev.] T. GREGORY SMART; Lytham, February 7, 1879.

SOME VARIETIES OF *PACHNOBIA HYPERBOREA*.—I possess some specimens of *Pachnobia hyperborea (alpina)*, which were bred by Mr. Clark, of Rannoch, and which are of singular beauty. No. 1 is dark chestnut-colour; markings very distinct. No. 2, deep Vandyke-brown. No. 3, grey; rich chestnut bands. No. 4, blue-grey, with quite black stigmata. No. 5, straw-coloured grey, with amber blotches and no dark marks; careful painting alone could represent their delicate or rich beauty.—ID.

INSECTS TAKEN AND BRED IN 1878.—April 20th, one *Gelechia junctella*, beaten from willow at Witherslack. April 24th, larvæ of a *Gelechia* found at Lytham, roughly described as follows:—Dark grey, with red spots; feeding in sand cocoons at roots of *Cerastium* and *Stellaria*; produced, July 6th, a little *Gelechia*, which Mr. Stainton pronounces to be new, and allied to *G. Knaggsiella*. More must be bred before naming. April 29th, *Micropteryx Sparmanella* and *M. Salopiella*, at Witherslack, flying in the afternoon sun. April 30th, a larva of *Diplodoma marginepunctella*, at Witherslack; fed on larvæ of *Triquetrella*, and emerged June 20th. The *Triquetrella* all emerge females, and are very plentiful. July 6th, larvæ of *Depressaria capreolella* in *Pimpinella saxifraga*, not in radical leaves, but high up the stems; green, black head: all sent to Mr. Sang, who bred them later. July 6th, larvæ of *Nepticula betulicolella* in small, contorted galleries, in birch, filled with brown excrement; larvæ bright yellow; produced imagines August 15th. July 24th, larvæ in cones of birch; green and horny-looking; produced five imagos of *Gracilaria populella* from July 28th to August 1st. August 19th, cones on *Polygonum hydropiper*, found on this date, produced *Gracilaria phasianipennella* from September 1st to 10th. This and *G. populella* are very much infested with ichneumons. August 19th, a pupa spun up in the hollow of a *Carex* blade, and covered all over with a thick white web; is expected to produce the long-wished *Elachista serricornella*. August 20th to October, many larvæ of an *Elachista*, supposed to be *Ochreella*, were found in a long stiff grass; plentiful at

Witherslack on the wet mosses; described roughly as blackish, reddish brown head, and generally mining up. September 7th to October, larvæ of *Elachista tæniatella* found in plenty in *Brachypodium sylvaticum* at Grange. August 19th, I think that this was the date when I took plenty of imagos of *Glyphipteryx schœnicolella* on the wet mosses at Witherslack, but being mistaken for *Fischeriella* at the time no date was put down. October 5th, plenty of larvæ of *Nepticula æneofasciella* in blotches in leaves of agrimony at Grange. Can any one send me larvæ of *Nepticula agrimoniella* in exchange for these? October 5th, after great difficulty I found on this day a few larvæ mining in *Festuca ovina*, and described as slaty brown, which are no doubt those of *Elachista dispunctella*. This confirms what I formerly said about this insect,—that it would be an autumnal feeder, would hibernate in old grass-stems, and change late in spring. In June, 1876, a larva was found, and described as greyish yellow, which produced an imago, July 8th.—J. H. THRELFALL; Preston, Feb. 3, 1879.

NOTE ON AQUATIC DIPTEROUS LARVÆ.—Whilst making some observations on the animal life present in, and characteristic of, polluted waters, I was struck with the fact that dipterous larvæ, such as gnats (*Culicides*) and midges (*Cheironomides*), are far from being, as commonly supposed, valuable sanitary agents. A popular modern author writes: "Even in our ponds at home we are much indebted to the gnat larvæ for saving us from miasma." But in numerous experiments and observations made during the past summer, I invariably found that gnat larvæ, blood-worms, &c., intensified putrefaction, and caused the decomposition of organic matter dissolved or suspended in water to take a more malignant type. The excreta of these creatures appear to me to contain in fact a powerful ferment, though I hope to examine further into this question during the next season. As regards the blood-worm (*Cheironomus plumosus*), I observed that in water containing dense layers of confervæ it forms itself a tube or cell, by boring into these growths. If placed in a glass only sparingly coated with confervæ, the larva forms tubes by collecting together granules, as described by Mr. E. Cox in the 'Entomologist' for December (Entom. xi. 261). On putting a single blood-worm into a glass I found that it made six or seven distinct cells, inhabiting sometimes one and then another.—J. W. SLATER; 3, Bicester Road, Aylesbury.

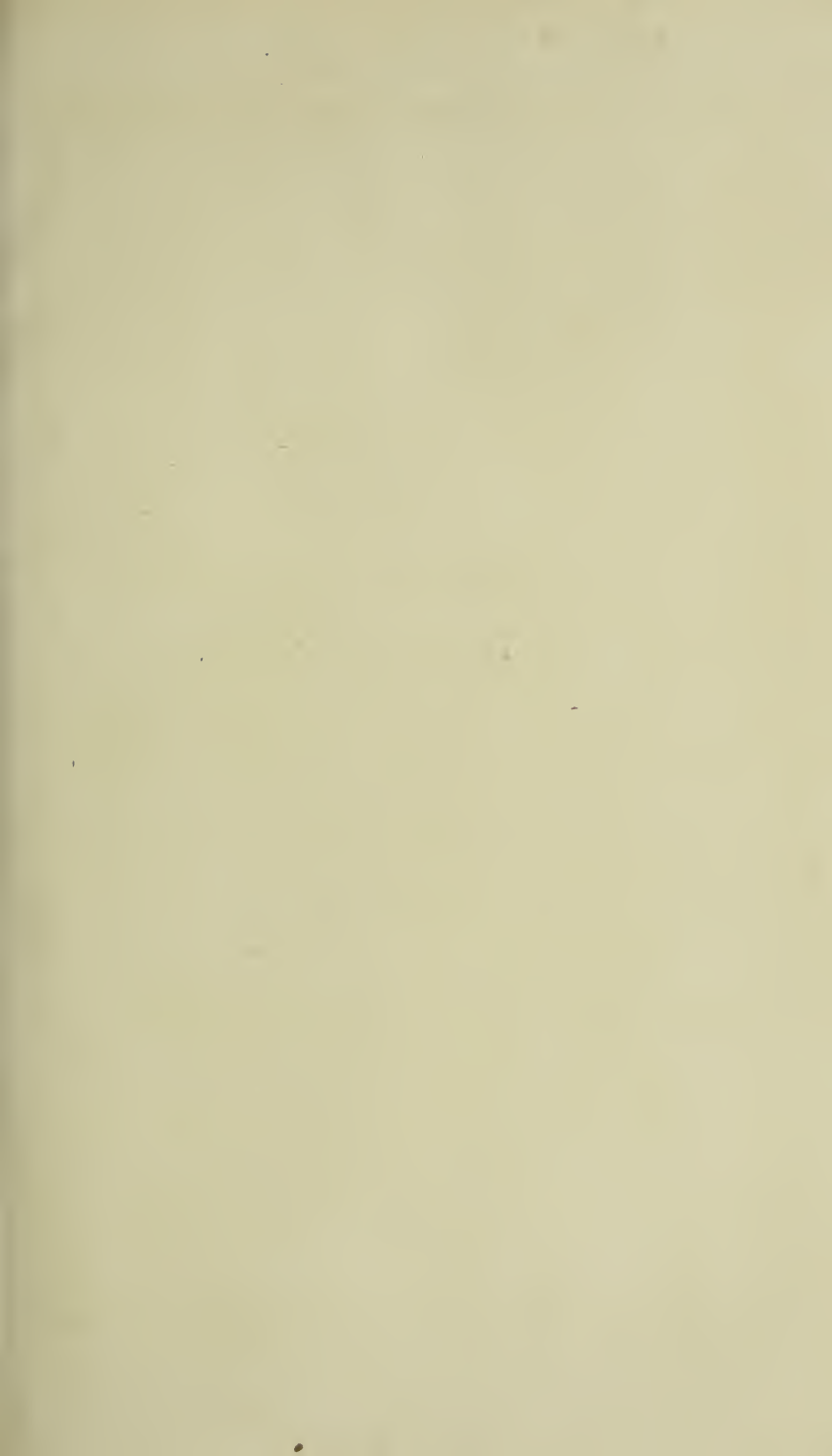
FREDERICK SMITH.

BORN, December 30th, 1805.

DIED, February 16th, 1879.

Honest and thorough in his work; kindly and genial when the outer crust was broken through; possessed of great knowledge, and ever willing to impart it;—he leaves a gap not readily to be filled.

He shall return no more to his house; neither shall his place know him any more.





Believe me

Yours very truly
Fred M. Smith

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BIOGRAPHICAL NOTICES.

No. III.

FREDERICK SMITH.

THOUGH born in London, on the 30th December, 1805, the subject of this notice was a son of Mr. William Smith, of Water Fulford, near York, and was educated at Leeds. When his school-days were over he was apprenticed to Mr. W. B. Cooke, an eminent landscape engraver, in Soho Square, who had lodging with him a nephew, William Edward Shuckard, then apprenticed to a firm of booksellers in Paternoster Row. The two lads occupied the same room; and thus commenced a friendship which lasted till Shuckard's death. At this time neither of them exhibited any partiality for Entomology; but after several years Shuckard returned to his native town of Brighton, "and having much time on his hands he used to employ it in rambling over the downs, and on one occasion while there his attention was by mere accident attracted by some insects scrambling up a sandy bank. One of these he caught; it was *Cicindela campestris*; he admired its beauty, went again and again to the downs, and there, on the sandy banks, saw bees burrowing. His hymenopterous studies dated from these solitary rambles on the Sussex downs. He soon afterwards procured a copy of Kirby's 'Monographia Apum Angliæ,' and from this time his whole energies were devoted to Hymenoptera." (Entom. iv. 182.) The future author of the 'Essay on the Indigenous Fossorial Hymenoptera of Great Britain' soon won over his friend to the same

pursuit; and while still a young man Frederick Smith had become an ardent collector of bees and ants, and a close observer of their habits.

In those early days his favourite collecting ground was Hampstead Heath, but by degrees he extended his researches to Lowestoft and Southend, to Deal and Weybridge, to the Isle of Wight, and many another sandy district in the South of England, until he acquired an unprecedented acquaintance with our indigenous species. Nor did he confine himself exclusively to Hymenoptera, for he made a collection of Coleoptera also; and in the days when John Walton flourished he paid especial attention to the Rhynchophora. On the death of Mr. Bainbridge in 1841, he was appointed to the office of Curator of the Collections and Library of the Entomological Society of London. This post he filled for nine years, or thereabouts; and on every Monday during that period he was to be found at the Society's Rooms, in New Bond Street.

As pupil first and afterwards as assistant to Mr. Cooke, Frederick Smith contributed to many of the works which were published by his master, including a considerable number of engravings of important pictures by Turner, Constable, and David Roberts. But having been engaged by Dr. Gray to arrange the British Museum Collection of Hymenoptera, he was employed upon this work at the time when a vacancy in the Zoological Department was created by the death of Edward Doubleday, in December, 1849. Shortly afterwards Frederick Smith was appointed one of the permanent entomological staff of the Museum; and thenceforward he abandoned art for science, and relinquished engraving as a profession. But he engraved, from Westwood's drawings, the plates of Wollaston's '*Insecta Maderensia*' (1854); and all those plates which illustrate the British Museum Catalogues of Hymenoptera, and his own papers in the Transactions of various learned societies, were drawn and engraved by himself.

At a meeting of the Entomological Society held on the 3rd April, 1837, Mr. Ingpen read a letter from Mr. Smith, giving an account of the natural history of one of the *Cynipidæ* which inhabits the small flat galls on the under side of oak leaves (Proc. Ent. Soc., 1837, p. xliii). This, I believe, is the first published notice of Frederick Smith's observations. On the 2nd September,

1839, he read before the same Society some notes on the habits of British ants, which, however, were not printed until 1842 (Trans. Ent. Soc. iii. 151). From 1842 to the time of his death his publications were unceasing; and some idea of his activity may be gathered from the fact that the Royal Society's Catalogue of Scientific Papers enumerates no less than ninety-seven prior to 1863, the chief of which appeared in the 'Annals and Magazine of Natural History,' the 'Zoologist,' the 'Transactions of the Entomological Society,' and the 'Proceedings of the Linnean Society.' During the last fifteen years the stream has continued to flow on; and it is probably within the mark to say that at the time of his death there had appeared from Mr. Smith's pen, in the various scientific publications, not less than one hundred and fifty entomological papers, many of them monographs of high importance, all of them containing something that was worthy of record. To these must be added the works compiled by him for the Trustees of the British Museum, including the Catalogues of British Hymenoptera (with sixteen plates, 1855 and 1858; a second edition of the *Andrenidæ* and *Apidæ*, in 1876), and the Catalogues of the Hymenopterous Insects of the whole world (seven parts, with thirty-seven plates, 1853 to 1859),—works which, under the modest title of Catalogues, in addition to the synonymy, contain detailed descriptions of hosts of new species, and notes on habits and economy.

Elected a member of the Entomological Society in 1850, he was one of the most constant in his attendance, and for many years served on the Council. He was President in 1862 and 1863, was repeatedly a Vice-President, and had been re-appointed to that office only a fortnight before his death. All who have been in the habit of frequenting the meetings of the Society will remember his never-failing readiness to impart his knowledge to others; and whenever he was appealed to on any question connected with our indigenous Hymenoptera he had always something valuable to communicate, not taken second-hand from others, but the result of his own personal observation.

With regard to exotic species it may perhaps be doubted whether he kept himself sufficiently acquainted with all that was being done by his contemporaries abroad; but as regards the British Hymenoptera he was for the last quarter of a century without a rival. An accurate observer, he has done much to

advance our knowledge of the group; a painstaking describer, he has laid foundations that will serve for future classifiers to build upon. Regular and methodical in his habits, patient and persevering, laborious and industrious,—like his favourite ants and bees,—he plodded on, piling fact upon fact, and adding to his ever-increasing store of knowledge. His writings may not be characterized by the polished style of the ‘Monographia;’ yet, in his way, Frederick Smith was a worthy successor of William Kirby; and it is to be hoped that his collections of Hymenoptera will find a home, side by side with Kirby’s types, in the great National Institution which for more than eight and twenty years he served so well.

Unassuming in manner, retiring and somewhat reserved with strangers, Mr. Smith was warm and affectionate at heart; possessed of a quiet sense of humour, he had a capacity for entertaining others which was probably unsuspected by the generality of his acquaintances, and was known only by those who have met him in the unrestraint of social gatherings. Of simple tastes and thoroughly domestic habits, he was devoted to his family, and in turn beloved by them. A widow and four children survive to lament his loss.

Mr. Smith died on the 16th February, 1879, from exhaustion consequent upon the operation of lithotrity. His last resting-place is in Finchley Cemetery, near the hunting grounds of Hampstead and Highgate, where so many happy days of his peaceful and uneventful life were spent. His colleagues have lost a faithful friend, the public a conscientious servant, and Entomology an earnest and indefatigable votary.

J. W. DUNNING.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. XII. NYMPHALIDÆ.—NYMPHALINÆ.

(Genera allied to CATONEPHELE and DYNAMINE.)

THE genus *Epiphile* contains several handsome species from Tropical America, expanding a little over two inches. The fore wings are rather truncated at the tips, with a projection on the upper part of the hind margin, below which the wing slopes off to

the hinder angle in a rounded concavity. The hind wings are rather long, with the hind margin dentated. The wings are rich brown or black, with orange oblique bands sloping outwards from the costa of the fore wings (always well-marked below), and sometimes produced on the hind wings. Sometimes the greater part of the wings, or only the centre of the hind wings, are suffused with rich blue above. The under side of the hind wings is dull brown, with a rather indistinct row of eyes; towards the tip of the fore wings is a more distinct eye, generally indicated by a white dot above. But all the species have a more or less triangular yellowish white or slightly silvery mark on the costa of the hind wings beneath.

The type of the next genus, *Myscelia Orsis*, a common Brazilian butterfly, has a strong projection below the tip of the fore wings, and the hind wings are rather strongly dentated and nearly square, the strongest tooth being nearly opposite to the anal angle. The male is of a dark purplish blue, with the tip and hind margins black, shading here and there into dull reddish, a large oblong black patch below the cell of the fore wings, and the hind wings denuded of scales on the costa to below the cell. The basal half of the costa of the fore wings is narrowly reddish, and there are also some pale spots partly representing the markings of the female, which is black, the fore wings with a white basal streak, and two others running obliquely from the costa across the cell, beyond which is another row of spots running from the costa, and dividing opposite the projection on the hind margin, one row running to the hinder angle and another to the middle of the inner margin. Corresponding to these, are an inner white stripe and an outer row of spots on the hind wings, which are also marked with a bluish stripe towards the hind margin.

The next genus, *Catonephele*, is closely allied to this; but it is specially remarkable for the great disparity between the sexes. The species vary in size from two inches to three and a half; the hind margins of the fore wings are oblique, and those of the hind wings rounded and more or less scalloped. The fore wings of some of the females, however, are deeply concave below the middle of the hind margin. Many of the species are very common in Tropical America.

C. Obrinus is black, with a broad blue band across the fore wings, and a broad orange band across the hind wings. The

female is brown, with an additional blue spot on the costa of the fore wings near the tip, and one or two red spots bordered with black in the cell; the hind wings have three obscure narrow black stripes, the outermost sometimes marked with one or two blue spots, and having a row of black spots within it. The males of the other species are of a rich black, with a broad orange band, differing in shape and size, running across both wings, which is sometimes divided towards the tip of the fore wings, or else reduced to two large spots. The females generally resemble that of *Myscelia Orsis*, but the pale markings are sulphur-yellow, and there is a reddish spot below the tip on the fore wings and at the anal angle of the hind wings. The females of other species are black, with a yellow transverse band on the fore wings, and some rather indistinct yellowish macular stripes towards the hind margins of all the wings. The butterflies frequent forests, and the larvæ are armed with branching spines.

Temenis Laothoë is a very variable species, expanding two or two inches and a quarter across the wings. The hind margin of the fore wings is concave below the tip, and the hind wings are slightly dentated and rather oval, sloping off to the anal angle. They vary from pale tawny, with the tip of the fore wings brownish and blotched with tawny, and a black dot towards the anal angle of the hind wings, to rich tawny or orange, with the tip black, glossed with purple, and marked with orange; and sometimes the hind wings have a purple border varying in width, or are glossed with peach-colour over the orange; or may even be wholly blackish, with a white dot instead of a black one. The under side of the hind wings is brownish, glossed with purplish, with an incomplete row of small submarginal eyes, with black and blue pupils, and there are some white blotches on the costa of the hind wings. The larva is covered with branching spines, and has two very long ones on the head. It is common in South America.

The genus *Nica* resembles this, but the fore wings are broader in proportion and but slightly concave, and the hind wings project a little in the middle, making them more square. The species, too, are smaller, measuring only an inch and a half in expanse, or a little more. They are orange-tawny, with the tip of the fore wings blackish, with a yellow spot (*N. Flavilla*, from Brazil), or broadly black with (*N. sylvestris*, Upper Amazons), or without

(*N. Canthara*, Venezuela), a white spot. The under side is paler, with a broad reddish brown transverse stripe, bordered with bluish white on the inside on the hind wings, and on the outside on the upper part of the fore wings; outside this are two white spots, more or less surrounded with black near the costa of each wing, and two very small ones near the anal angle of the hind wings, represented on the upper side by black dots.

Peria Lamis is a scarcer South American butterfly, nearly resembling *Nica* in shape and size, but with rounded and less denticulated hind wings. It is of a uniform dark brown above, and dull yellow below, marked with a transverse reddish brown stripe, outside which is a row of small black dots on the hind wings. The fore wings are marked below with two dots near the tip and one in the cell.

We now come to the rather extensive South American genus, *Dynamine*, which includes the smallest species of the true *Nymphalinae*, some of which do not expand more than an inch, while the largest scarcely exceed an inch and a half. Some species are white, with the tip of the fore wings broadly brown or black, and marked with one or more white spots, and the costa is broadly dark, and frequently greenish or bluish. The hind margin of the hind wings is also dark, and there is sometimes a dark transverse stripe in the middle, extending to the inner margin of the fore wings. On the under side the dark portions of the wings are lined and blotched with reddish and bluish grey. In other species the males are bluish, greenish, or brassy, with dark borders, and sometimes large dark spots on the fore wings, and the females are brown (sometimes bluish towards the base), with from one to three white bands on the hind wings, and white spots on the outer half of the fore wings. On the under side of the hind wings are two large black eyes, with blue pupils and yellow rings, placed on a reddish band, edged with white on both sides. In other species the males are bluish or greenish, spotted with white, with the tip and hind margins black, and sometimes a second black band on the hind wings, within the border. The females are black and white, and the under sides of the hind wings are silvery grey, with transverse or submarginal reddish lines or stripes, often bordered with black; but without eyes. These pretty little butterflies are found flying about bushes, or at the edges of woods.

In my next paper I shall treat of *Catagramma* and its allies, which form one of the most beautiful and characteristic groups of South American butterflies.

A LEPIDOPTERIST'S GUIDE TO LYNDBURST.

By BERNARD LOCKYER.

(Continued from p. 78.)

WE will now leave the umbrageous shades of Denny Wood (very nearly sacrificed to the woodman's axe, some years since, by the orders of the Government Surveyor, but saved to the public through the generous exertions of Lord Henry Scott, of Beaulieu), and returning to Lyndhurst, take the easternmost of the three roads running south through the cultivated tract round the village. We pass Foxlease Terrace on the right, and at the end of the first half mile cross a bit of ornamental water running through Foxlease Park. Just beyond this a lane opens out on the left, leading to a broad grassy path (Beechen Lane), having on the right Park Ground Inclosure, and on the left Pondhead; both these are inclosed by ditches and wooden palisades, overgrown with lichens (the favourite resting-places of *Cymatophora ridens* and various *Geometrae*, &c.) Along the palings is a good growth of willow, wild rose, and other shrubs (the resort in spring of *Anticlea badiata*, *A. derivata*, &c.), and at the end of the path you find yourself in an open tract of forest, extending along the north-east boundary of Park Hill Inclosure to Denny Wood, and called Park Hill Wood and Botley Field. It was here that, in August, 1874, I thrashed out of a beech tree a juvenile larva of *Acronycta alni*.

Several gates open out of both inclosures. Enter Pondhead by the first you come to, which leads straight through the inclosure to Park Hill private grounds. Here I have taken both the imagines and larvæ of *Lithosia aureola*. The other species occurring here are common to most of the older inclosures, so I will not further mention them. Returning to the main road, follow it down, passing the hamlet of Clay Hill on the left, just beyond which you will see the Keeper's Lodge at the entrance to Park Ground (or Jones's) Inclosure. Opening the gate you enter a broad path, lined with oak trees and bushes; on the

ground a mass of bracken, bramble, primroses, wild violets, &c., and (past the end of the entrance ride) perfectly carpeted by trailing honeysuckle, here and there forming luxuriant festoons and bowers amongst the other undergrowth, which in the denser parts of the wood includes much fine sallow, a good cover for larvæ of *Apatura Iris* and *Stauropus fagi*. *Pericallia syringaria* frequents the honeysuckle. At the right hand corner of the first cross ride *Lithosia mesomella* and *Epione advenaria* occur, together with an occasional *Coremia propugnata*. *Phorodesma bajularia* and *Acidalia trigeminata* are common, the latter coming freely to sugar. In and beyond the cross path the oak is interspersed with tall fir trees, which I found in 1875 to be the favourite resting-places of *Tephrosia consonaria* and *Boarmia roboraria*. Both species rest at some height from the ground, and seldom give a second chance of capture when dislodged. They fly wildly; and *B. roboraria* (which is best taken in the early morning, and which comes to sugar late at night) is only to be taken plentifully by the aid of a long pole, like that used to capture *Apatura Iris*. The whole wood is a capital sugaring ground; and, in 1871, I captured here most of my *Triphæna subsequa*, together with crowds of other species, many of which, however, did not occur there again. *Lithosia complana*, *Boarmia repandata* (var. *conversaria*), and many other *Geometræ* visit the sugared trees, and in the autumn *Noctua glareosa* puts in an appearance.

Almost enough has, perhaps, been already said and written anent the gay butterfly denizens of this (to the student of Nature at any rate) attractive wood; I will, therefore, only add that the deliciously cool and shady nature of the rides where they occur most prolifically, renders this a pleasant, as well as productive, retreat in which to observe their lively and elegant evolutions. On the most tropical of summer days, only broken gleams of sunlight penetrate through the canopy of leafy boughs overhead; so that a chase after the maddest of males, scared from his nectar-sipping among the blackberry bloom, or from amorous gambols around some recently arrived coquette of the opposite sex, does not result in the overheated fatigue produced by a scamper after an *Argynnis* in the open rides of the newer inclosures.

If, instead of following the cross drive to the gate leading into the open tract facing the high road (Clay Hill Heath), you

take the first ride to the left and follow it to its outlet, you will see, across the rough ground, the rails of a large inclosure of young fir trees, surrounded with furze and birch bushes, &c. This is Park Hill Inclosure, and one of the most extensive in the forest. Keep to the right, enter the first gate and follow the ride to the first cross path, where turn to the left, and you are on the collecting ground for many of the New Forest specialities. This is a very broad grassy ride through the inclosure, planted on either side with small oaks and firs alternately, with occasional larches, and here and there an ancient forest tree left standing *in situ*, interspersed with large clumps of bramble, &c.; the various grasses common to the forest occurring, together with plants of heather, *Centaurea*, *Lotus*, *Hippocrepis*, *Scabiosa*, *Campanula*, *Orchidaceæ*, &c. Here, in May and June, by walking through the long grass, you cannot fail to disturb the local but unattractive *Acosmetia caliginosa*—a weak flyer, very easy to capture, and having very much the appearance of a *Crambus* when on the wing. *Hyria auroraria* occurs, but is very scarce, chiefly, I was told, frequenting the banks of the deep ditches which drain the inclosure in all directions, and where the herbage is most luxuriant. It is a very swift flyer, glittering like a little gold-encircled gem as it flashes past one in the sunlight. I only saw one alive, and that eluded all my endeavours to effect its capture. The best way is to follow this path along the edge of the inclosure (passing seven cross paths on the left and eight on the right) for about two miles, to its termination in a path through the centre of the wood. Here turn to the left, and keep straight on to the gate of the inclosure, opening out into another bit of rough ground; when you will see, facing you, the entrance-gate into the last inclosure to which I shall ask you to accompany me in this direction, viz. Stubby Copse. This is a wood not quite as old as Park Ground and Hurst Hill, but containing trees of very much larger growth than those in Park Hill. The undergrowth is exuberant and very varied, and small flowering plants (such as those already mentioned in describing the inclosure we have just left) are very abundant—I mention this because they are absent from many of the older inclosures. It is a large wood, and extends almost to the South Western Railway. The species taken here and in Park Hill are (with the exceptions already

mentioned and some others) common to both. I have elsewhere enumerated the greater number, but, besides all the British species of the genus *Argynnis* (except *Lathonia*), &c., *Nemeobius lucina*, *Thecla rubi*, *Euthemonia russula*, *Arctia fuliginosa*, *Nemoria viridata* and *Acidalia immutata* may be taken on the wing or disturbed from the herbage by day. *Erastria fuscula* may be dislodged from bramble, and *Aventia flexula* has also been beaten from the undergrowth. The four New Forest species of the genus *Zygæna*, *Plusia iota*, and *P. pulchrina* are to be captured buzzing at flowers—the first-named in great profusion. There is a gateway opening out of Park Hill Inclosure into Denny Wood, where I used to observe *Gonepteryx rhamni* lazily fluttering about the thistle-heads whenever I passed on a sunny day. I never witnessed such an assemblage of this gaily-coloured species elsewhere, though it was of more or less frequent occurrence all over the open forest, where it was much wilder on the wing and flew higher. The larvæ of *Dicranura furcula* and *Notodonta ziczac* may be found feeding on sallow.

Stubby Copse is surrounded for miles on all sides by wooded country; and all the district is well known to the Brockenhurst collectors, but personally I know nothing about the localities, except that they have been very productive. The largest are Denny Lodge Inclosure (including Woodfidley) to the eastward; Frame Heath Inclosure and Frame Wood to the south-east; New Copse Inclosure to the south, beyond the railway; and Pignal to the west. To the north of the latter lies Ramnor Inclosure, which can also be reached by following the rails of Park Hill to the right (instead of entering the inclosure) till you reach the first entrance lodge (after turning sharp to the right, where the two inclosures meet), where the hospitable keeper, Mr. Gulliver, is always ready to entertain visitors with a cheap glass of milk and an account of his latest captures. Here a path commences, which runs straight through to Pignal: there are some delightfully secluded nooks in this wood, purple with blue-bells in the spring, and which are said to be the best localities in the neighbourhood for the *Macroglossæ* and *Nemeobius lucina*, but I never found them commonly; indeed I know very little about the productions of this inclosure, which are said to have decreased in number since the undergrowth was cut down in 1871.

The extensive tract of forest commencing at the north-west corner of Park Hill Inclosure, and extending thence southward over an undulating tract of country, for about a mile and a quarter along the Brockenhurst Road, is known as Holland's Wood. On the opposite side of the way is another tract, extending from Foxleaze Park, opposite Park Ground Inclosure, to New Park (lately the well-known seat of Mr. W. Dickinson), and which lies opposite Ramnor. Both woods are of much the same character; but the undergrowth is, perhaps, more abundant and more varied in Holland's Wood, and it is of larger extent; indeed it is so comparatively trackless and dense that, without a companion, it is no joke to work it at night.

To return to Holland's Wood. Besides the "Crimsons," *Dicycla oo* occurred here in 1871; but the larvæ, having apparently been destroyed by the early frosts which in the two succeeding springs left the oaks quite blackened in May, it has only been seen singly since—at least up to 1875. The (at any rate till lately) extensive clumps of birch in this wood, and down the valley in Whitley Wood opposite, produce most of the usual birch-feeders, including *Notodonta dictæoides*, *N. dromedarius*, *Acronycta leporina*, and *Ennomos tiliaria*. I have seen more than one larva of *Stauropus fagi* and *Acronycta alni* taken in these woods; and, amongst oak feeders, *Ennomos erosaria* and *Cidaria psittacata* may be mentioned. In Holland's Wood there are some fine clumps of sallow, the most conspicuous being near a pool at the southern end of the wood. Somewhere near here *Dasycampa rubiginea* has been captured in the spring; and I am told that *Acidalia inornata* is to be taken. At the top of the slope, opposite the southern end of Park Ground Inclosure, there is a thick copse of sloe and hawthorn, which was the frequent resort of *Corycia taminata* and *Ligdia adustata* in May, 1875; and it was among the scattered trees just about here that I captured my first *Triphæna subsequa* at sugar, in August, 1871.

Cerigo cytherea, *Noctua neglecta*, *Catocala sponsa*, and *C. promissa* occur here, more or less abundantly, every season, and common species are a perfect pest. After 1871 I always found the Crimsons and *Cerigo cytherea* commoner outside than inside the inclosures. The sugared trees must be approached with great caution when the *Catocalas* are out. *C. promissa* requires an especially deft hand to effect its capture, as it sits on the sugar

with wings erect and vibrating ready for flight; while *C. sponso* frequently allows them to drop roof-like over its body: both, when disturbed, fly upwards, careering round and round the tree with great velocity.

(To be continued.)

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of DR. S. C. SNELLEN VAN VOLLENHOVEN,

By J. W. MAY.

(Continued from vol. xi., p. 247.)

LYDA CLYPEATA, *Klug*.

Imago.—Klug, Die Blattwespen nach ihren Gattungen und Arten in Magazin der Gesellsch. nat. Freunde zu Berlin, ii. (1808) p. 279.

Larva.—Schrank, Fauna Boica, ii., 1, p. 255. Ratzeburg, Die Forstinsecten, iii., 83, Pl. I, f. 5. DeGeer, Mémoires (translation by Goetze), ii., 2, pp. 288 and 293; Pl. 40, figs. 15, 16, 24, 25, and 26. Frisch, Insecten in Deutschland, viii., 38, pl. xix.

Lyda nigra, abdomine maculis lateralibus 6 aut 8 pallide luteis, apice ferrugineo, pedibus ferrugineo-flavis; antennarum articulo quarto longissimo, alarum fascia transversa fusca.

Long. 11 mm. Exp. alarum 24 mm.

By some writers this insect is called *Lyda Pyri*, Schr., from the passage in the 'Fauna Boica', above indicated, where, however, Schrank only gives a very short notice respecting the appearance and food of the larva, which seems to me (following the authority of Ratzeburg) insufficient to give the right of priority to his name; for which purpose it is absolutely necessary that the diagnosis of the perfect insect should be sufficient to distinguish it from others of the same genus. For this reason I retain the name given by Klug in 1808. The genus *Lyda*, to which this species belongs, is, in this country, represented by but few species, which, moreover, are somewhat scarce: of the eight indigenous species with which I am acquainted I have only been able to observe the larvæ of two, namely, the present one and another species, the green larva of which occurs in Gelderland

on the leaves of the apricot, but the imago of which I have never taken. The larva of *Lyda clypeata* was first described by Frisch, who did not succeed in rearing the insect; next by Réaumur, who was equally unsuccessful, and subsequently by De Geer, who was more fortunate.

I found the larva near Heemstede, on pear trees, but I have no notes of the particulars. In the autumn of 1861, on the 2nd of October, my colleague Herklots brought me a number of larvæ which he had met with, also on a pear tree, at Warmond, where he was then living; fig. 1 is drawn from one of these. The larvæ of the genus *Lyda* are known to have no middle legs, and to live in a web in somewhat considerable numbers. The description of my larvæ, taken down at the time, is as follows:—The body is robust rather than slender, of an orange colour, in which at some times the red and at others the yellow tint predominates. The head (fig. 2) is shining black, and globular; the situation of the eyes is not so readily distinguishable as it is, for example, in the larva of *Cimbex*. The two long antennæ (fig. 3) to be seen at the sides of the forehead are composed of a number of joints, and are annulated with pale and dark brown; they are placed on an oval excrescence of a pale brown colour, which might be regarded as the first joint. The jaws are black; palpi and labium yellow, annulated with black.

The body is strongly wrinkled, being, however, nearly flat underneath; on the back the middle segments are divided into four larger folds. On the first segment, on either side of what might be described as the neck, is a triangular shining black spot, and just before the base of the anterior pair of legs is another similar spot, but much smaller. The openings of the stigmata were so narrow that I could not clearly make them out. The last segment of the body (fig. 5) is rounded at the end, and at the same time somewhat flat; it has on either side a little leg of a singular form, consisting apparently of two joints, of which the first is thin, cylindrical, and rather long, and the second pointed, with the basal half of an orange colour and the remainder shining black (fig. 6).

In addition to the absence of middle legs and the singular arrangement of the antennæ-like posterior legs, there is another circumstance by which these larvæ are distinguished from those of other *Tenthredinidæ*, namely, that the antennæ are placed

obliquely above the eyes, while in the others the eyes are above the antennæ. I do not find this mentioned by any author: I am, however, certain on this point, singular as it may appear; unless, indeed, I have failed to observe the eyes, and have taken for them little round wart-like excrescences.

Different writers have correctly described the habits of these larvæ, living together in a web, like the larvæ of *Hyponomeuta*. I have not made a drawing of the web spun by the larvæ on the pear, but I have figured the web from a hawthorn hedge, which I met with on the 6th of July at a country seat in Gelderland: this will be found represented at fig. 7. The larvæ inhabiting this web were somewhat differently coloured from those of the pear tree, but resembled them in general appearance. They were not of so deep an orange-colour, and had two paler longitudinal stripes along the dorsum; in addition, the anal legs were not black at the tips, as was the case with the former (*see* figs. 8 & 9); but as most German writers assert that the *Lyda* larva of the hawthorn is the same as that occurring on the pear, I have not hesitated to give a drawing of it in this place. I was not able to rear any of these larvæ, as they were all killed or washed away by a heavy rain the evening before I had intended to remove them to take them home with me. The larvæ from the pear tree, when full grown, spun a short case-like web from the pear branch to the earth contained in the glass in which they were kept; there was nothing remarkable in this, and it was, consequently, not half so pretty and interesting as that which DeGeer kept as a curiosity (*see* the description in Goetze's translation at page 294).

My larvæ also remained the whole winter in the ground, and when an imago made its appearance I turned over the earth in order to find a pupa: I found one which was, however, somewhat shrivelled; the remaining larvæ appeared to me to be dead. I was thus prevented from making a drawing of the pupa, but, after carefully examining my shrivelled pupa, I can endorse DeGeer's assertion that the antennæ, palpi, legs, and wings were separate and movable; only I cannot agree with the observation "dass sie ohne die mindeste Bedeckung da legen," as in this instance these organs—as is the case with the other sawfly larvæ—were covered with a very thin and transparent skin.

The one imago which I obtained was a female (fig. 10), and

seemed to be so far imperfectly developed, as the neuration in either wing shewed a hiatus here and there. The left wing especially had more than one imperfection; for example, there were only two marginal cells instead of four, while in other places, also, parts of nervures were wanting. In figuring this imago I have restored the absent nervures, but in the third discoidal cell I have retained a redundant process of the lower nervure, which occurred in both wings.

The following is a description of this insect without the defects:—Length, eleven mm.; expansion of the wings, twenty-four mm.; head very broad and flat, dull black, rough, with two short longitudinal lines on the after part; between the antennæ are two yellow transverse lines; labrum black; the mandibles armed with two teeth, of which the outer is much longer and more pointed than the inner, the mandibles themselves being yellow with dark brown tips. The four palpi ferruginous. The antennæ, which are inserted between the eyes, are setiform, and have twenty-two joints, the last of which are very difficult to distinguish; the first joint is very small; the second, somewhat club-shaped, is a little bent outwards and of a yellow tint, shining, and having a fine black longitudinal line on the upper side; the third joint is short, reversed conical, and yellow; the fourth, as long as the preceding three, is narrow at the base, where it is of a yellow colour, becoming piceous farther on and a little thicker; the fifth is somewhat thinner, and is only a third of the length of the fourth; the fifth joint is black, as are all the following, which regularly decrease in length and thickness (fig. 11). The eyes are tolerably large and projecting, very nearly oval in outline, and of a dark brown colour; the three black ocelli are difficult to distinguish. The thorax is transversely depressed and rough on the dorsum, only the anterior lobes being smooth and shining, for the rest rough and dull. The tegulæ are dull yellow, the cenchri black. The wings are rather broad, very shining, transparent, and with brown nervures; the stigma is brown and thick, and from it descends a smoke-coloured band, which runs transversely across the anterior wing and on to the posterior wing, where it is of a fainter tint, and curves round the middle cell.

The abdomen is flat and broad; the first five segments are blue-black, the fourth and fifth having a pale yellow spot on either side; the following three are ferruginous with pale yellow

spots on the sides. On the ventral surface the first segment is entirely blue-black; the second is of the same colour, with a bilobed yellow transverse mark in the centre; the third is similar, but having, in addition, a little pale yellow spot on the side; the fourth is pale yellow in the middle and at the sides, brown and black between; the following segments are rose-coloured, the first of these having a black and pale yellow spot at the side.

The legs are orange-yellow, the two anterior pairs with the coxæ and lower half of the femora black, the posterior pair having only a shining black band on the femur. The anterior tibiæ are without spines, but the intermediate and posterior tibiæ have three past the middle, the first separate, and, farther on, the two others together.

A very fine female example, taken near Haarlem in June, 1866, by Mr. Ritsema, differs somewhat from the preceding. The two lines on the forehead between the insertion of the antennæ are replaced by a yellow triangular spot. The neururation of the wings is normal. The fifth segment of the abdomen is ferruginous above, with pale yellow triangular spots at the sides, and above, on either side, a blue-black mark. The under surface of the abdomen is represented at fig. 12. Lastly, the posterior femora have no continuous black band, but only a small black curved line beneath.

Klug states, *loc. cit.*, that he was not acquainted with the male of *Clypeata*; Hartig only mentions with respect to it that the abdomen is yellow, with the base black. Ratzeburg describes it somewhat more fully, and gives a figure of it. According to this author, it differs from the other sex in its whole aspect being yellow, the legs being entirely pale yellow, with the exception of the bases of the coxæ, and the abdomen, excepting the base, being brown-yellow. As I also never saw the male, I have copied Ratzeburg's figure on my plate 5.

The eggs I have never seen. Ratzeburg says that Dahlbom met with the imagos in Sweden, and also found the eggs on the edges of the leaves of the hawthorn, but I do not know where the Berlin professor met with this statement: at all events, it is not to be found where one would most naturally look for it, namely, in the '*Clavis novi Hymenopterorum Systematis*,' page 38—*Lyda Hortorum* (?), where Dahlbom gives a very short description of *Clypeata*.

This species probably occurs throughout the whole of temperate Europe.

I think it well to add that F. Boie ('Stettiner Ent. Zeitung,' xvi. 50) distinguishes two very nearly allied species of *Lyda*, of which the one (*Clypeata*) has twenty-four joints in the antennæ, and the other (un-named), only twenty-two. According to this writer, the larva of the former species lives on the cherry—and pear (?),—that of the latter species on the hawthorn. It is difficult to form an opinion on this matter. If it were as Boie thinks, then the two larvæ which I have figured would belong to two different species; but it seems to me very probable that the antennæ as a consequence of more or less abundant food may be unstable as to the number of joints, just as some species of *Selandria* are unstable in the occurrence and the situation of the transverse nervures between the submarginal cells. The question whether we have to do with two different species must be left for further investigation.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

DEIOPEIA PULCHELLA.—I have just examined a good specimen of *Deiopeia pulchella*, which my brother captured last August (1878) at Ventnor. He took it in a stubble field, in which clover had been grown in 1877.—W. C. DALE; Polegate, Sussex.

BOMBYX QUERCUS.—In the 'Entomologist' for 1878 (Entom. xi. 270) Mr. Laddiman, of Norwich, remarks upon the "great mortality amongst the larvæ" of *Bombyx quercus*. My experience, in Sussex, has been quite different. In 1875, and the three following years, I collected some dozens of these larvæ, of various ages, all of which produced imagos. I found the best cage to be an empty hat-box: the bottom of this was strewed with dry twigs of blackthorn, amongst which the cocoons were spun. I seldom got two females of the same tint; and last year (1878) I bred one nearly as dark as a male.—ID.

LEPIDOPTERA TAKEN NEAR YORK. — *Orgyia gonostigma*.—Whilst examining some birch trees on the 7th September, I noticed a larva of this species seated on a leaf. Some years ago I took two larvæ off sallow, but had not seen it again until last year; I therefore beat the trees, in the hope of finding more,

when, much to my surprise, sixteen larvæ turned up. They are now undergoing the process of hybernation. I hope to have the pleasure of rearing them to the perfect state. I am not aware of this species being recorded from York before. At the same time I beat out the long serrated cases of *Coleophora limosipennella*. *Amphydasis betularia*, var. *Doubledayaria*.—I bred twenty-six specimens of this variety last year. *Agrotis aquilina* and *Hadena suasa*.—These I took at sugar in September; also a curious variety of the latter, which has the orbicular stigma quite round, and the claviform stigma almost absent. *Dicranura bifida*.—I have pupæ of this species remaining over to the third year.—THOMAS WILSON; Holgate Road, York, March, 1879.

IDENTITY OF *CRYMODES EXULIS* AND *HADENA ASSIMILIS*.—In answer to the Rev. T. G. Smart's questions about *Crymodes exulis* in the March 'Entomologist' (Entom. xii. 84), the best authority probably on the subject is Dr. Staudinger, who, some years ago, was in Iceland, where the insect is abundant. He wrote exhaustively about it in the Stett. Ent. Zeitung in 1857 on his return. After taking and rearing about six hundred specimens his conviction is that *Assimilis*, as figured by Newman, and *Exulis*, and the many species of Guenée, viz., *Gelata*, Lef.; *Grænlandica*, Dup.; *Gelida*, Gn.; *Poli*, Gn.; and *Borea*, H.-S.; are all one and the same insect. He expressly states, and has also repeated in his letters to me, that he found its variableness almost incredible. I do not know from what insects the drawings in Newman's work were made, but I am inclined to think that his names, as representing varieties, are inverted. My types of *Exulis* are of the size and shape of his *Assimilis*, light brownish grey ground colour, scales coarse and thick; as the varieties shade off to the opposite extreme of his *Exulis*, the size becomes smaller, the shape more that of *Adusta*, the scales finer, and the colour deepens to rich brown. *Hadenæ Zeta* and *Pernix* (Alps and Pyrenees), and *Maillardi* (Alps and Central Norway) approach closely to *Exulis*, but I have not seen them.—N. F. DOBREE; Beverley, East Yorkshire, March 14, 1879.

CHEIMATOBIA BRUMATA.—Having bred several females of *Cheimatobia brumata*, I find that the number of ova contained in each, averaged about two hundred and fifty, and that the larvæ

emerged in about two months.—G. C. BIGNELL; Stonehouse, Plymouth, March 14, 1879.

PLUSIA GAMMA IN MARCH.—On March 5th I saw, and could have captured, a specimen of *Plusia gamma* on a lamp by the road-side; and also on March 6th I saw a hybernated specimen of *Vanessa urticæ*. Does *P. gamma* hibernate?—C. HALE; Nassau School, Barnes, Surrey.

NYSSIA ZONARIA IN EPPING FOREST.—At the meeting of the Haggerston Entomological Society, held February 27th, Mr. E. Cooper exhibited two males and one female of *N. zonaria*, bred, from larvæ taken on one part of Epping Forest, 1878. Unfortunately he cannot give the exact spot, not knowing the larva at the time of capture; but states that of one of three localities in the Forest he is certain, not having collected any larvæ elsewhere. I have no doubt Mr. Cooper will try to follow up the discovery of this interesting species so near London.—J. BRYANT (Secretary); 10, Brownlow Street, Dalston, March 13, 1879.

BREPHOS PARTHENIAS.—On March 20th we saw this moth in great numbers in West Wickham Wood, but owing to the high wind were unable to take very many. Last season there was hardly a solitary specimen seen.—W. F. ROBINSON; 35, Collingham Place, S.W. J. L. SHADWELL; 4, Kent Gardens, Castle Hill, Ealing, March 21, 1879.

TAPINOSTOLA HELLMANNI.—One of your correspondents recorded last year Monks Wood as a new locality for this species: to the best of my belief this was, a year or two ago, its best-known habitat. When I first went to Cambridge, in 1872, Mr. T. Brown told me he was in the habit of taking it there, and described it as not very uncommon, flying at dusk among long grass or reed, adding that he knew of no other locality. Consequently, I was somewhat astonished to find it abundant at Wicken Fen, and, indeed, had some difficulty in persuading Mr. Brown of the identity of my captures with this species. Mr. F. Bond, with whom I corresponded on the subject, kindly informed me that he had also found the insect abundant at Wicken years ago, and had bred it from larvæ feeding in *Arundo phragmites*, a fact not generally known, I believe, among entomologists.—F. D. WHEELER; Chester Place, Norwich.

PERICALLIA SYRINGARIA.—Having noticed an article on this species as double-brooded, in the December number of the 'Entomologist,' I thought that my own experience with it this season might interest some. Having obtained a batch of eggs this spring, I sleeved them out on a privet hedge, and expected them to hybernate as larvæ; consequently I was a good deal surprised when, on examining the sleeve in July, I found it contained a good number of pupæ. I opened the bag and found that about one quarter of the larvæ were still small, while the greater part of the batch had pupated. The latter emerged in August, and their progeny are now hybernating together with the remains of the former brood, from which they scarcely differ in point of size. I never bred this species before, and had no idea that it was double-brooded, but on discovering this to be the case I examined the authors I had to refer to, and find that, of English works, 'Merrin's Calendar' gives as its time of emergence vi., vii., and s. viii., while Guenée says simply May and August, and Treitschke calls it distinctly double-brooded, the second brood being "less numerous, but more productive than the first," by which, I suppose, he was not aware that this brood is only a partial one.—F. D. WHEELER; Chester Place, Norwich.

CATOPTRIA ÆMULANA.—There are two forms of this insect under the above name, which I believe will prove to be distinct species. One form I have bred in some numbers from larvæ found feeding in the seed-heads of golden-rod, collected at the end of September; and in October, in woods in Kent and Surrey. The other form occurs on the salt-marshes at the mouth of the Thames, and has not yet, I believe, been reared from the larvæ; this I have never taken, having no opportunities of working its localities. The salt-marsh form is considerably larger than that reared from the golden-rod,—its markings are more distinct and silvery, and its colours brighter. Professor Zeller considers them identical; but my friend, Mr. C. G. Barrett, thinks these two forms may prove distinct species, but waits for proof. Its larvæ is likely to be found on some of the composite flowers (possibly *Aster tripolium*) growing at the mouths of rivers near the sea. Cannot some of the numerous readers of the 'Entomologist,' who are in the habit of visiting our favourite watering-places in the autumn, succeed in finding the larvæ and send a few to my friend for examination, and settle the question of their

identity or distinctness?—WILLIAM MACHIN; 22, Argyle Road, Carlton Square, February 17, 1879.

TELEPHORUS LIVIDUS *var.* DISPAR.—In one of the back volumes of the E. M. M., Mr. Rye, in recording his captures at Folkestone, says he found in abundance “the, to him hitherto rare, *var. dispar* of *Telephorus lividus*.” I infer from this that it is somewhat restricted in its distribution. Round here the variety is almost as plentiful as the type, and I have commonly seen the male *T. dispar* in cop. with the female *T. lividus*. I do not remember ever seeing this order reversed. With regard to dark forms generally, I find them by no means uncommon. In my low-lying fields the black *var.* of *Pterostichus cupreus* is as abundant as the typical insect, but always smaller and more elongate. I have also *Lema cyanella* almost black, and one *L. melanopa* with the elytra entirely dull black. Last June I took about a dozen of *Strangalia nigra*, all of which had the legs entirely black. Of the two descriptions of this insect at my command, one does not mention the colour of the legs, but the other says “legs pale yellowish.” I have never seen the latter form, but take a few with black legs every year.—THOMAS H. HART; Kingsnorth, Kent, February, 1879.

EGG OF CALYCOPHTHORA AVELLANÆ.—On the 5th of February of the present year a number of the *Phytoptus* bud-galls of the hazel were brought me containing the Acari, *Calycophthora avellanæ*, Am., in such enormous quantities that they clung together in masses, or were sprinkled over the inside of the diseased bud in as great numbers as dipterous larvæ may be found in some dead animal in warm weather. They were of various sizes, all apparently healthy and active, and in no way suffering from the severe winter; and amongst them were a few eggs almost on the point of hatching, but still retaining their characteristic shape. About the beginning of February, 1877, I had found similar eggs amongst the *Phytopti* of the witch-knot of the birch (figured Entom. x. 85; also see x. 280), but these were usually pressed out of all egg-shape by the *Phytoptus* within, and could scarcely be known as true eggs save by watching the escape through the broken pellicle. In the case of *Calycophthora avellanæ* this year the shape of the egg was still perfect or nearly so, of an obtuse oval, about one-fifth more in length than breadth, and not larger at one extremity than the other.

The pellicle, as far as I could make out, was simply a thin skin without any markings of its own, but of such extreme transparency and delicacy that the transverse striæ of the contained embryo might be seen perfectly clearly through it; and it also, sometimes, retained the markings of the striation of the tenant where there had been much pressure. The eggs varied slightly in appearance, as if at different stages; one oval, and filled throughout with striæ very clearly discernible; another, similar in shape, but in which the embryo lay curled within, showed the unmarked pellicle like the most transparent film in the unoccupied portions of the egg, which yet had some degree of power of resistance to pressure, for on a *Phytoptus* squeezing itself between the egg and another body close by, the contained embryo was in no way disturbed in position. There were also many pieces of broken pellicle, possible remains of hatched eggs. I have never before met with shoots of hazel with such great numbers of the swollen and distorted bud-gall, characteristic of this especial *Phytoptus* attack; and their formation, as well as the numbers and health of the contained *Acari*, did not appear to have been retarded by the severity of the weather.—E. A. ORMEROD; Dunster Lodge, Spring Grove, Isleworth, March 17, 1879.

EARLY APPEARANCE OF *SIREX GIGAS*.—On February 4th I had a fine male *Sirex gigas* given me, transfixing with a pin to a piece of wood, alive. Evidently, from its freshness and perfect condition, it had only just emerged. Is not this unusually early for this insect to make its appearance, especially considering the severe winter we have had? Last summer, no less than twelve *Sirices* were taken in an ironmonger's shop here.—JOSEPH ANDERSON, jun.; Chichester.

SIREX GIGAS, NEAR YORK.—Two specimens of this insect were captured at Holgate during the past season. Since then I have been splitting some boles of *Pinus austriaca*, when I discovered a number of larvæ of different ages of this species, some of them apparently full fed. Those full grown were about the size of full-grown *Sesia bembeciformis* larvæ.—T. WILSON; Holgate Road, York.

EASY METHOD OF SPACING CABINET-DRAWERS.—Being about to line out with fine thread the spaces in my cabinet-drawers for the series of insects to go into them, and conceiving that there would be a difficulty in tying all the knots at an equal distance from one another, the following plan suggested itself to me, and I have

found it answer very well, being both neat and expeditious, and requiring no great amount of skill or patience to make or use:—Procure a piece of white buckram, such as luggage labels are made of, and put a nice even coating of glue (not too thick) upon one side, taking care to keep the other side perfectly clean, then lay by till quite dry; next get a small punch or a pair of eyeletting pincers such as those used by boot-makers, and punch out of the buckram twice the required number of gummed pieces, cut the silk or thread to the proper length or width of the drawers, then damp each end and press them upon the glued side of the labels, rubbing them down with the finger-nail: when dry, the line is complete. They can now be fixed in the drawer and pulled tight, by passing the point of a fine pin through the centre of the label with the forceps and pressing the line down flat to the surface of the drawer.—E. HOLTON; 131, Holborn Hill, February 10, 1879.

[Our correspondent kindly forwarded examples of this method of spacing cabinet-drawers, which for neatness excels all other methods we have seen.—ED.]

ENTOMOLOGICAL PINS.—In view of the large number of valuable entomological specimens which are destroyed by the corrosion of the pins on which they are transfixed, I would wish to call attention to the great advantage that accrues by using black pins. A long time since Mr. E. G. Meek recommended to me some black pins, which, after considerable trouble, he had produced. I had some, and have used them ever since, and do not find the slightest trace of corrosion. Some of my friends, to whom I had recommended these pins, suggested that black pins must look unsightly; and they were surprised to find that every insect of mine, which they had recently seen, was pinned with a black pin, and that they should have overlooked this fact. So far from their marring the appearance of the insects, I think these pins are particularly neat. They are made of the same sizes and strength as the ordinary gilt, or plain, entomological pins. In writing this, my only object is to bring under the notice of the readers the very valuable improvement Mr. Meek has introduced, and one which will be the means of preserving the more fragile moths, and those most liable to destruction, through corrosion of the metal caused by the chemical action set up by "grease." Mr. Meek may be congratulated upon his success.—A. B. FARN; Dartford.

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HYMENOPTERA BRED FROM CYNIPS KOLLARI GALLS.

By EDWARD A. FITCH.

WE know of several isolated instances of illegitimate inhabitancy of galls by various orders of insects, which enter them at various stages of their existence, either to undergo their transformations or on account of the facilities offered for a secure and snug retreat from the snows and frosts of winter. This is not surprising; the young and succulent galls cannot be considered to offer an unsuitable pabulum for many phytophagous larvæ; the mature growth in many cases offers a substantial home to certain species, and when empty and in the decrepit state certain galls offer throughout the winter a most convenient hybernaculum to all insects, size only being the consideration; large numbers of small spiders and mites also avail themselves of these advantages. The large, round, woody, marble galls of the oak, commonly known as the Devonshire gall, is abundant everywhere. Last winter Mr. Walter P. Weston collected a quantity of these galls for the purpose of rearing *Ephippiphora obscurana*; he was not only successful in this, but secured from them a most interesting general collection. This included six species of Lepidoptera (Entom. xi. 239); seven Coleoptera, and thirty Hymenoptera: our note refers especially to the latter. The six Lepidoptera were all Tortrices, and have been sufficiently referred to. The Coleoptera were *Olibrus æneus*, Fab. (common); *Dasytes æratus*, Steph. (abundant); *Anaspis maculata*, Fourcr. (five or six); *Orchestes quercus*, L. (a few); *Cœliodes quercus*, Fab. (two specimens); *Coccinella bipunctata*, L., and *C. variabilis*, Ill. (a few specimens of each). These were probably all hybernating imagos, and call for no special remarks. Not so the Hymenoptera, which were as follows:—

Dineura (Nematus) Degeeri, Klug.—This common and variable sawfly is spoken of by Mr. P. Cameron as being only a birch feeder (Scot. Nat. ii. 113). The larvæ feed gregariously in the autumn; they spin their cocoons in October, but do not become pupæ till April or May. Mr. Weston bred one male and one female from the galls in which the larvæ doubtless spun up in the autumn.

Emphytus succinctus, Klug. (= *togata*, Panz.).—The larva of this fairly common sawfly is an oak, willow and birch feeder. Since the species is known to hibernate as a full-fed larva (Stett. Ent. Zeit. ix. 176) it is easy to account for its presence in the galls, where it found a convenient shelter in which to pupate. Mr. Weston assures me the specimens (two males and three females) were bred in the galls, as he observed them drying their wings.

Harpiphorus lepidus, Klug. (= ? *Fenusia Ianthæ*, Newm.).—One specimen only of this uncommon sawfly was bred. Dours says "La larve vit sous les feuilles mortes des chênes" (Catalogue, p. 17), and Mr. Cameron writes me that nothing further is definitively known of its life-history. Kaltenbach states that Kirchner has observed the larvæ of *Emphytus melanarius*, Klug., *E. togatus*, Klug., and *H. lepidus* in the interior (pith) of rose twigs; (Pflanzen-feinde, p. 222), but there is probably some confusion as to *Lepidus*.

Cynips Kollari, Hart.—The principal emergence of this insect—the true gall maker—takes place in the autumn, but somewhere about 20 per cent are not developed till the succeeding summer; consequently many specimens emerged from Mr. Weston's galls.

Synergus Reinhardi, Mayr.—A quantity of these cynipideous inquilines were bred. Four species are common in these galls, all of which winter in them; the specimens I examined were all *S. Reinhardi*, but it is probable that *S. melanopus* also occurred.

? *Cryptus* sp.—Six examples (four males and two females) of a remarkable and interesting Ichneumon were bred. Although a particularly well-marked species, it is difficult of determination, even generically. Mr. J. B. Bridgman, Dr. Capron, Dr. Kriechbaumer, and the late Mr. F. Smith all saw them, but without a satisfactory result as to their nomenclature.

Hemiteles areator, Panz.—Eight or nine females of this pretty but common little Ichneumon were bred. It has been recorded

from variable hosts; e.g., *Orgyia pudibunda*, *Lasiocampa pini*, *Psyche* sp., *Tortrix viridana*, and other Tortrices; *Yponomeuta padella*, *H. cognatella*, *Cerostoma costella*, *Gelechia albipalpella*, *Coleophora coracipennella*, *C. therinella*, *C. anatipennella*, and other Tineæ; *Hedobia imperialis*, *Anthrenus museorum*, and several other Coleoptera; *Lophyrus pini* and *L. variegatus* among the sawflies. In some instances this species, like others of its genus, has been proved to be hyperparasitic, and from the above list it is to be inferred that such is always the case. Its immediate victims are other Ichneumonidæ, probably of the genera *Cryptus*, *Phygadeuon*, or *Microgaster*. *H. areator*, has previously been bred from the galls of *C. Kollari* (Entom. ix. 53), and from the common oak apple of *Andricus terminalis* (Entom. ix. 35). Other species of *Hemiteles* have been bred from spiders' eggs, and one, *H. mandibulator*, Duf., is said to be a common parasite of *Crabro rubicola*.

Hemiteles spp.—Two others belonging to separate species were bred; although good specimens I have been unable to get them named. Dr. Kriechbaumer thus writes me about them: "Amongst the insects in my collection there is one species which Foerster identified as *Locketica macrura*, most nearly related to these two females, but identical with neither: it has a complete areola."

Campoplex sp.—One specimen was bred. This is somewhat damaged, but it is, I believe a *Campoplex*. One species of this genus, *C. cerophagus*, Grav., is parasitic on *Emphytus melanarius*; this may have had a similar economy. According to Marshall's catalogue *C. cerophagus* is, however, a *Limneria*.

Limneria sp.—In Marshall's catalogue there are seventy-three British species included by him in the genus *Limneria*; hence it may be supposed that amongst such close allies it is difficult to identify a single specimen, which is all we have in the present case.

Mesoleius formosus, Gr.—This beautiful little Tryphon, of which one specimen only was bred, belongs to a large genus, the species of which are mostly known to be sawfly parasites. In this instance it is probable that *Dineura Degeeri* was the victim.

Exochus globulipes, Desv.—The genus *Exochus* is almost exclusively parasitic on Micro-Lepidoptera, though Kawall thinks that *E. coronatus*, Gr., and its variety *E. erythronatus*, Gr., may

probably be parasitic on *Cladius viminalis*; doubtless this Desvignian species appropriated one of the Tortricideous inhabitants. Two species were bred.

Ephialtes spp.—Several specimens of these fine Ichneumonids were bred, and they are amongst the most interesting of the collection. There are certainly two new species and probably a third. I have carefully compared them with Ruthe's and Desvignes' collection in the British Museum, and with all the descriptions and figures I can find, especially Gravenhorst, Ratzeburg and Holmgren. I sent seven specimens (two males, five females) to Dr. Kriechbaumer, who quite agrees that there are two undescribed, and tells me they are quite distinct from any of the numerous species which are in the Munich Museum collection, and in his own. He especially mentions several small species bred from *Carpocapsa splendana* (from acorns), *Lipara lucens* (from reeds), and *Nematus vesicator* (from willow galls), with none of which they agree. Prof. Frey-Gessner and M. Lichtenstein have given some interesting accounts of bramble inhabitants in two recent numbers of 'Entomologische Nachrichten' (iii. 94 and 140). Numerous examples of *Ephialtes divinator*, Rossi. (= *Histrio*, Pz.) were bred early in May, which Lichtenstein says is parasitic on *Cemonus unicolor*, *Psen atratus* and *Trypoxylon figulus*, and, according to Dours' Catalogue, on *Cemonus rufiger* (teste Goureau). *E. mediator* is also parasitic on *Cemonus unicolor*, and it is probable that in these galls *Ephialtes* was similarly parasitic on some *Crabro*, as Mr. Weston particularly noticed the limp wings and ovipositor, which proved the specimens not to have been hybernators.

Clistopyga incitator, Fab.—Six males and one female of this rather variable Pimplid were bred. It is figured in 'Pinacographia,' Pl. xiii. fig. 8. Nothing certain is known as to the economy of the genus, but the few species are probably Lepidopterous parasites. Gravenhorst's *C. hæmorrhoidalis*, with which the female agrees, is given as a variety of *C. incitator* in Marshall's Catalogue.

Apanteles glomeratus, L.?—Three specimens, which are apparently identical with the very common *A. glomeratus*, were bred. This is uncertain, however, as doubtless these were hibernating imagos, which I think is not the habit of the *Pieris*-feeder. There was another, but single, specimen which was abundantly distinct. This can at present only be characterised as *Apanteles* sp.

Eurytoma rosæ, Nees.—Two specimens belonging to this difficult genus of *Chalcididæ* were bred. Dr. Mayr has lately monographed it (Verh. z-b. Gesell. Wien. xxviii. 297—334), but still there is likely to be much confusion, especially to anyone following Walker's determination. Altogether, three very distinct species have been bred from *Kollari* galls. The common inhabitant of this and other oak, rose, &c. galls, is the variable *E. rosæ*, Nees (= *Abrotani*, Fonsc., = *squamea*, Wlk.); its size and time of appearance are altogether uncertain, but its black colour and structure is of course constant. *E. setigera*, another oak gall inhabitant, is distinguishable at once by the two long spines on the hind tibiæ, and *E. nodularis*, Boh. (= *rubicola*, Gir.) differs in many points. This latter species is a common parasite of various *Crabronidæ*, also of *Cryptus*; so that in *Kollari* galls it is possibly hyperparasitic on a lodger. Both Mr. Weston's specimens are *E. rosæ*.

Syntomaspis caudata, Nees.—Several specimens of this common oak-apple parasite were bred. When first I sent this Torymid to Mr. Walker as from *Kollari* galls, he altogether doubted it, it then being known only as a common parasite of *Andricus terminalis*; however, he afterwards bred it from these galls himself (Entom. ix. 53). Dr. Mayr only knew it from *A. terminalis* and *N. lenticularis* galls.

Callimome regius, Nees.—This very common but brilliant cynipideous parasite was of course bred in quantities. Being parasitic either on the gall maker or the inquiline, it varies greatly in size and somewhat in colour.

Megastigmus stigmaticans, Fabr. (= *giganteus*, Kollar).—This is one of the finest and prettiest of our British *Chalcididæ*, but varies considerably. Mr. Weston bred about a dozen examples (male and female). It is generally common, but in these galls only, in Britain. Mr. F. Walker bred 1103 specimens (682 males and 421 females) from one lot of *Kollari* galls in one year.

Lamprotatus sp.—Two beautiful specimens of a *Lamprotatus* were bred. This is probably a new species, but a large number of captured specimens have been described, which it is almost an impossibility to again recognise. Walker described forty-three British species in the 1st volume of the 'Entomological Magazine' under the generic name of *Miscogaster*, and quite as many more in 'Monographia Chalciditum,' 'Ann. Nat. Hist.,' 'Brit. Mus. List,'

'Ann. Soc. Ent. Fr.,' &c. I sent one of these specimens to Dr. Mayr, who tells me that in his large experience he never met with a *Lamprotatus* from these galls. Very little is known of their economy, but Van Vollenhoven records that Snellen bred *L. punctiger*, Nees, from a dipterous pupa, on May 15th, 1875. (Tijd. v. Ent. xix. 251.)

Pteromalus tibialis, Westw.—This common gall-parasite was bred abundantly.

Homalus (Hedychrum) auratus, L.—This pretty and widely distributed species is the commonest of our British Ruby-tails. It has only lately been known as an inhabitant of these galls (Entom. xii. 24). Mr. Weston bred nine specimens. Like all the *Chrysididæ*, it is parasitic on various *Aculeata*; in this instance the *Odynerus* was doubtless the victim, but it might have been *Prosopis*. This parasitism and inquilinism of the second degree is difficult to trace.

Homalus cæruleus, Degeer, Dahlb. (= *Elampus violaceus*, Wesm.) One specimen only of this species occurred. Mr. F. Smith tells us all his specimens were from bramble-sticks (Ent. Ann. 1862, p. 102); it is difficult to connect it with its host in this instance, but it was most probably *Prosopis*.

Rhopalum (Crabro) clavipes, L. (= *crassipes*, Fab.). Three males and one female of this *Crabro* were bred. It is not altogether uncommon for various *Crabronidæ* to take possession of these galls, though it has been but lately noticed in Britain. Dr. Mayr has bred *Trypoxylon figulus*, *Stigmus pendulus* and *Cemonus unicolor* from them. These alone, of course, engender a fresh and numerous army of parasites. *C. unicolor* is the species most generally met with in this situation, and Dr. Giraud has given a detailed account of its parasites in 'Verh. z.-b., Gesell. Wien.' xiii., 1282. Dr. Rudow also writes "Die leeren Gallen beherbergen kleinere *Crabronen*, *Pemphredon* und junge *Meconema varium*, (Archiv Mecklenburg Vereins, 1875, 50)."

Passalæcus insignis, Van d. Lind. Several specimens of this generally common species were bred. Walker once bred a specimen of the closely allied *P. gracilis*, Curt., from these galls.

Odynerus trifasciatus, Oliv., Fab., Smith, nec St. Farg. (= *tricinctus*, Herr.-Schæff.) Two males of this rare solitary wasp were bred.

Prosopis rupestris, Smith.—Last but not least. Mr. Weston

was fortunate enough to breed two males and three females of this recently described and presumably rare bee. The numerous species of *Prosopis* are by no means particular where they construct their nests; any ready-made cavity seems to be appropriated. Mr. F. Smith instanced bramble-sticks, dock-stems, hole in a hollow flint, holes in the mortar of a wall, burrows and tunnels of various *Fossores* and *Osmiæ*, &c.; and Mr. J. Bridgman writes me, "*Prosopi* will make their nests anywhere. I have found them burrowing in soil like *Halicti*, in the old burrows of *Chelostoma campanularum*, in an old post, making use of the old cells of *Colletes Daviesana*, two of them in a cell partitioned off lengthwise in brambles and in old beetle-burrows." To these may now be added, abandoned galls. The genera *Prosopis* and *Sphecodes* were at one time considered to be parasitic, being destitute of the usual appendages adapted to convey pollen: but Mr. F. Smith has proved otherwise (see Entom. iii. 305, and 'British Bees,' p. 7). The female of *P. rupestris* is described in 'Ent. Ann.,' 1872, p. 103, and Mr. Smith was to have perfected his description by describing the previously unknown male. This MS. and specimens were in his hands, but, willing as we know the spirit of our veteran Hymenopterist was, the flesh was weak. The male is, however, rather smaller than the female, the body less ovate; the knee-joint of all legs whitish, the female having only the knee-joint of the hinder pair white; antennæ longer than in the female, and the face with two white side marks and a white clypeus, which latter is black in the female.

For years I have bred from these galls by the hundred, and never met with any species of *Aculeata*, *Tenthredinidæ*, or *Ichneumonidæ*. Mr. Weston's experience requires explanation: in collecting his stores he gathered them in winter, and mostly those galls from which the normal inhabitants had escaped; I always collected earlier, and especially rejected the empty galls, my purpose being the Cynipids and Chalcids. We now see what a harvest may be reaped from the abandoned or pierced galls. Should others be led to follow this line of collecting, I would ask them to remember that all the species bred have a certain value, whether they belong to a favourite order or otherwise. In the small circle of a gall several life-history facts may be established conclusively, although many of the above-mentioned insects were only hibernators in convenient winter-quarters.

A LEPIDOPTERIST'S GUIDE TO LYNDBURST.

By BERNARD LOCKYER.

(Concluded from p. 101.)

If you follow a path (commencing just before the sloe bushes) down the slope leading through the Birch Copse overlooking a heath at the bottom of the valley, you will, after rather more than half a mile's walk, reach the gate of Hurst Hill Inclosure, about which I have said all I need say already, except that the larva of *Boarmia consortaria* was perhaps of more frequent occurrence here than elsewhere in August, 1874, and that *Xylina rhizolitha* comes freely to sugar. All the open forest outside the gate is good sugaring ground. Follow the path through this inclosure to the opposite gate, when you will find yourself in another tract of beech-shaded forest, watered by two streams of some width, which flow into Lymington water. This is "Queen Bower," rendered additionally lively on a summer's day by the presence of numerous fluttering *Libellulidæ* of perfectly tropical brilliancy. At Queen Bower is the junction of the two streams. Follow their united course to the east as far as the first bridge, where cross the stream and keep to the right over the extensive expanse of rough country called Ober Heath (following the course of the stream), till you arrive at the gate of a small inclosure of the same description as Pondhead, &c., having a young fir plantation on the right-hand side. This is Fletcher's Copse, where, alongside of a stream, are some five sallows from which I beat the only larva of *Gonoptera libatrix* that ever fell across my path; but where, strange to say, the oaks were almost entirely destitute of larvæ. On the further side of this copse you will find a narrow lane, and directly in front you will see the rather imposing entrance to Rhinefield Sandys—a broad avenue of stately oaks of a much larger growth than those surrounding them. When I first lighted on this inclosure, on 16th August, 1874, it was apparently a *terra incognita* to collectors, for there were no signs of sugaring, and, as I have already stated, larvæ were more abundant than in any other inclosure I had worked. It was here that I took the only larva of *Stauropus fagi* that ever came into my possession. A winding path, about a mile and three-quarters long, brings you out on the main Christchurch road opposite

the large tract of woodland known as Burley Inclosures. Vinney Ridge, a large new inclosure containing a heronry, lies to the right. It is stated that *Pieris crataegi* is common about here, but I never had an opportunity of verifying the truth of the statement. The only drawback to Rhinefield is the almost entire absence of undergrowth, there being scarcely any bushes and only a few wretched apologies for clumps of bramble, which appear—why I know not—to be quite parched up and only just able to rear their drooping heads above the soil. Just outside the entrance into the inclosure from the Christchurch road are, or were, a few very fine old oak trees, on one of which I took a small colony of the larvæ of *Cidaria psittacata* (which I had found rare elsewhere); they were very vividly coloured, and elongate even for *Cidariæ*. I will not trouble the reader to follow me to the other inclosures along the Christchurch and Ringwood roads. They are very large, and no doubt would be productive in a good season, as the undergrowth (which includes in some of them a good deal of maple) is denser and more varied than in many of those I have described. The beauties of the fine beech glades in this direction, and of Knight Wood and Mark Ash, have been held up to the admiration of tourists time out of mind; and between them and the Christchurch road lies such an extended expanse of woodland (*e. g.* Anderwood, Oakley and Burley old and new inclosures, &c.), covering more than four square miles of country, that it would be strange indeed if they were entirely void of insect inhabitants. One of them, noted for its fine holly and rhododendrons, is said to be a favourite resort of the *Macroglossæ* and *Lycæna Argiolus*; but their distance from my head-quarters prevented my caring to risk wasting time by neglecting the localities with which I was already acquainted in their favour, and I never met with any one who knew much about them. In one (Dames Slough Inclosure) I once took a solitary *Lycæna Corydon*, flying amongst long grass on a very cloudy day. This is a plantation of even smaller trees than those in Park Hill. The only other locality hereabouts that I shall mention is Gritnam Wood, a good-sized glade, composed principally of fine beech trees and occupying the rising ground to the north of Hurst Hill, between it and the Christchurch road. Here the larvæ of *Ephyra trilinearia* swarmed in 1874, and *Platypteryx unguicula* and *Lithosia rubricollis* are said to

be common. *Demas coryli* also occurs. With respect to Minstead, which can be reached either by following the road to Cadnam to the first turning on the left (Pike's Hill), and turning off to the left again, through a plantation of oaks and firs, into Manor Park, where a bye path takes you out on to the high road after about a mile's walk, or by keeping to the high road as far as the first mile-stone, where a road branches off to the left, which, after passing two turnings on the left, brings you to the entrance lodge to Manor Park, and, after about a third of a mile more, to Minstead itself. Follow this road past one more on the left, and one on the right, till you come to a path to the right leading to a beech glade, with the enclosed ground belonging to Castle Malwood at the upper end on the left, and a row of cottages on the right: behind these lies Shave Green Inclosure, which I found most profitable for day work in August, 1871. Though late in the season, most of the butterflies for which the forest is famed were common, but of course worn. Here I captured a remarkable specimen of *Argynnis Paphia*, in which the silver of the under side was replaced by pale iridescent pink and golden brown.

Cosmia affinis was commoner among some elms, near the cottage where I was staying, than I found it in other parts of the forest. *Boarmia cinctaria* is not rare among young fir trees on a heath somewhere on the Christchurch road; but the exact locality is a secret only known to one or two resident collectors, who, for the best of reasons, keep it a profound one. The only locality for *Eulepia cribrum*, with which I am acquainted, is on the road to Wimborne, in Dorsetshire, some miles west of Ringwood, the extreme westerly boundary of the forest; along with it I saw *Lithosia complana* beaten from small fir trees, and *Acidalia straminata* disturbed from among the heather. The locality is only a limited one, but the insect is a swift flyer and often leads one a long dance over the rough ground.

In conclusion, for the information of those who may prefer to procure lodgings at an hotel previous to starting for the forest, I may mention that the two best inns at Lyndhurst are "The Crown Hotel" and "The Stag." The latter used to be very comfortable in the days of its late unfortunate proprietor, and the prices were then moderate; but of its present occupier I know nothing. I omitted to mention that *Cidaria dotata* and

Noctua Dahlii have occurred on the wing, *Lobophora sexalata* on palings, *Xylina semibrunnea* and *X. petrificata* at ivy bloom are met with in and near the village.

27, King Street, Covent Garden, W.C., 1879.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. XIII. NYMPHALIDÆ.—NYMPHALINÆ.

(Species allied to CATAGRAMMA.)

Catagramma and its allies form one of the most characteristic and beautiful groups of Tropical American butterflies; and to this district all the genera are exclusively confined. They are not large insects, but are remarkable for their brilliant colours and markings, and generally frequent damp places in the forests, where they frequently settle on the wet ground.

The genus *Callicore* includes a number of closely-allied species, all of a rich dark-brown or velvety black above. The fore wings are crossed by a bar of changeable bluish green, blue, or purple, which runs obliquely from the middle of the costa to the inner margin before the hinder angle. The bar varies much in breadth, and the wing is frequently more or less suffused with purple towards the base. Towards the tip there is often a small white or blue spot. The hind wings are sometimes spotless, but are generally marked with a metallic-green or blue submarginal stripe; and are sometimes more or less suffused with the same colour within it. The under surface of the fore wings is of a rich scarlet towards the base, followed by a curved black band, varying in breadth; and the tip is silvery white or buff, intersected by a black line. The hind wings are silvery white or buff, with two oval black rings in the centre, each of which contains two black spots, varying in size, and sometimes connected. These are enclosed by two large black rings, which run round the whole wing, except on the costa, where the circle is not complete.

The genus *Perisama* much resembles *Callicore* in shape, the fore wings being triangular, and the hind wings rather more oval, and generally but slightly denticulated. The largest species

expand about two inches, but most species are rather smaller. On the upper side this genus resembles *Callicore*, but the band of the fore wings is frequently incomplete, and, when this is the case it is combined with more distinct basal stripes. The fore wings are black beneath, with the tip pale, and intersected by a black line; and the basal portion is frequently more or less broadly red or yellow. The black portion of the wing is nearly always more or less spotted with blue, which is never the case in *Callicore*. The under side of the hind wings is yellow, silvery white, or buff, and is nearly always crossed by two black lines running from the costa, and frequently diverging, but approaching each other again towards the anal angle. Between these runs a row of black dots, occasionally wanting, and sometimes accompanied by some slight whitish markings. In one species (*P. Bonplandii*) the whole under surface of the hind wings is uniform silvery white.

The genus *Catagramma* varies in size from one and a half to two and a half inches. It much resembles the last two genera in shape and appearance, but the eyes are naked instead of hairy. The species are of a deep black, adorned with rich shades of crimson or orange on the upper side, and frequently glossed with purple over the black, and in some cases over the crimson. In some species the sexes differ little; in others the males are crimson, and the females orange; or even, occasionally, black above. But the sexes differ much in their habits; the females generally lead a retired life in the forests, and are often very rare, even when the males are abundant. In one group of the genus the fore wings are marked above with a broad transverse orange bar, and the hind wings with a large metallic-blue blotch towards the anal angle. The fore wings beneath are black, with the orange band extending over the centre and more or less of the base of the wing, and towards the tip is a paler yellow line, followed by a pale blue line before the fringes. The hind wings are marked with alternate stripes of black or yellow, and with pale blue spots towards the anal angle; sometimes the centre of the wing is more or less broadly black, with an irregular row of blue spots; or yellow, enclosed by a black ring, and with black spots with one or two blue pupils upon it. The crimson species vary much in pattern above. Sometimes the crimson is confined to the fore wings, and may consist of a single stripe; or the

basal half may be rosy ; and there is frequently a white or orange mark near the tip. In other species the red covers more or less of the hind wings, and the fore wings are crimson at the base and crossed by a broad transverse crimson bar beyond the middle. The under side of the fore wings resembles the upper, but is paler, and the apical markings resemble those of the first section. The under side of the hind wings varies ; sometimes the centre is dull yellow, enclosing two large black spots, each marked with a variable number of eyes. This is enclosed by a black ring (incomplete on the costa), which is double towards the base and single towards the hind margin, where it is marked with a row of blue spots. Sometimes the black spaces on which the blue spots are placed are so extended as to occupy the greater part of the wing ; at other times the yellow ground is slightly suffused with red, and so extended as to fill the whole centre of the wing, being marked with two black eyes with blue pupils. There are a great number of species, but all with a strong family likeness.

The little genus *Hæmateræ* is also black or brown above, with more or less extended red markings. The species expand from one and a quarter to one and a half inch, and may be known from the allied genera by the brown under side of the hind wings, which is slightly varied with rusty, and indistinctly marked, as in some *Satyrinæ*.

Callithea, the most splendid genus of the *Catagramma* group, contains larger species, varying from two to nearly three inches in expanse, and chiefly found towards the west of South America ; the larvæ are spiny. In *C. Sapphira*, one of the handsomest of the genus, the male is of the richest blue, while the female is blue only at the base, followed by a broad transverse orange band on the fore wings, while the hind wings are bordered with dull green. The under side of the hind wings is dull green, with several transverse rows of black spots. Some of the other species are similarly marked, while others are bluish black towards the base, and with a pale bluish band round all the wings, almost like that of an *Elymnias*. The under side of all the species is green, frequently more or less orange at the base, and marked with transverse rows of black spots, some of which occasionally coalesce into lines.

ENTOMOLOGICAL RAMBLES, 1878.

By J. B. HODGKINSON.

I AM afraid, in relating my experiences of the unentomological season of 1878, I shall have to chime in with many others of your correspondents as to the paucity of insects; still it was not quite a blank to me. Perhaps this may be accounted for, to some extent, by my varying the districts in which I collected, thinking surely every place could not be alike. I was driven to this seeking for a change of scenery, for my old favourite prolific fields had become monotonous through the almost total absence of insect life. To begin with March, or couple the month of April with it, I found the birches to yield very few *Micropteryx* or *Incurvariæ*; *I. Zinckenella* was scarcer than usual, though I tried both Windermere and Witherslack. The hybernating species were almost unrepresented; a few *Peronea lipsiana* got up during the odd gleams of sunshine, leaving nothing to fill up my time with but looking for *Elachista* larvæ in the grass stems, both a cold and wearisome job. As a change, one got a little relief by looking for the larvæ of *Lampronia prælatella* again, just to fill up time more than actually wanting them. One remarkable thing struck me, and that was you might see a piece scooped out of the strawberry leaves the size of one's finger nail, quite fresh, still the cases that covered the larvæ were all brown and withered. The larva is not at all peculiar to the wild strawberry, for there was a large umbelliferous leaf it used quite as readily.

May comes in, and one naturally hopes for more specimens, especially among the genera *Lithocolletis* and *Nepticula*; but here comes the same sad story—there was one moth where formerly fifty occurred, a few *Nepticula sorbiella*, and among mountain ash and on the heath were pretty commonly *Cnephasia lepidana*, and among young birches *Nepticula lapponicaella* was pretty frequent. This new species I had named as *N. reversella* in my cabinet. It had previously been named *Luteella* for me; but when Mr. Sang sent on his *Luteella*, I at once saw they were quite distinct from my Witherslack specimens. From the 20th of May to the end of the month I made three journeys to get some *Nemoria viridata*; all that I saw were five specimens, though I used to take a hundred in a day. Seeing there were so few

moths I turned to larva hunting, and I met with some luck. I beat a sloe hedge for *Ephippiphora signatana*, where I ought to have had some dozens; nothing but beetles, bugs, and *Aphides*, with a solitary brimstone moth caterpillar, were to be found in my umbrella. With so many disheartening journeys, I felt glad to have a look round my breeding-room, and here I found *Nepticula æneofasciella*, hitherto a rare species, out in plenty—in fact, I set about 150. The same with *Ornix Scoticella*; this species was rather a disappointment to me, for I have tried in vain to breed from *Pyrus aria* what I thought would be a new *Lithocolletis*, so I went in heavily, making efforts to get a number to be certain. I found a tree of *Pyrus torminalis* as well, with four or five larvæ on a leaf; the result was *Scoticella* by hundreds. *Botys terrealis*, *Eupithecia virgaureata*, *Lithocolletis cavella*, *L. torminella*, *L. lantanella*, &c., kept coming out. I was most surprised to find a worn-looking specimen of *Cidaria reticulata* out with three wings. In fact, 1878 might be called a “three-winged” season, for there were many such in my breeding-cages. Quite a number of *Eupithecia denotata*, *E. subumbrata*, *Botys terrealis*, &c. Nothing pleased me so much as to see the result of my puzzle, viz., the larvæ in the stems of the balsam (*Impatiens noli-me-tangere*), when I was gladdened with the sight of the beautiful new Tortrix, *Penthina postrema* appearing. I bred eleven specimens, both sexes being among them. I made a journey to the spot where I got the larvæ, to see if any moths would turn up, but only got one poor specimen, and that was all I got for a journey of over one hundred miles.

Now June comes round, and I think it time to try fresh ground, and make my way to Arnside. On some high lands opposite to Grange-over-Sands, I find *Thera simulata* larvæ, and plenty of *Eupithecia sobrinata*. My main object was to see what could be turned up in this district among the *Rosa spinosissima*. About the middle of the month I collected a lot of twisted leaves, expecting to find the beautiful *Spilonota incarnatana* (*amœnana*), and possibly *Peronea permutana*; the latter I failed in, but from the leaves gathered I bred the rare *Incurvaria canariella*, *Peronea variegana* (all forms), *Spilonota roborana*, *S. incarnatana*, *Pædisca semifuscana* (some strange forms), and, oddly enough, *Gelechia expolitella*; these may have crept up from the grass beneath, but I noted at the time *Gelechia* larvæ. There were

plenty of *Coleophora gryphipennella* blotching the leaves. The pretty little *Cidaria fulvata* larva was feeding upon the same plant.

I crossed over to Grange, and found a colony of *Depressaria pimpinella* larva, from which I bred about thirty, and a few *D. capreolella*. One thing I especially noticed was that I could find no larva of *Nepticula æneofasciella* among the agrimony. The larvæ from the first brood ought to have shown in plenty, but they were absent; whereas in October they were in profusion on the same plants. Query, had the eggs lain over from some cause? Altogether the season was a strange one; flowers in profusion, but such a remarkable absence of insect life. Sometimes in former years I could not sweep without getting a net full, while in 1878 I swept several nets away to no purpose.

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

DESCRIPTION OF THE LARVA OF EMMELESIA ALCHEMILLATA.—The larvæ from which the following description was taken were sent to me at the end of September, 1877, by Mr. J. B. Hodgkinson, of Preston. He had found them feeding on the seeds of the common dead-nettle. Length nearly half an inch, and tolerably plump in proportion; head highly polished, it has the lobes rounded, is a trifle narrower than the second, but wider than the third segment; immediately behind it, on the second segment, is an equally polished half-circular plate, and there is also a similarly polished plate on the anal segment. Body cylindrical, of tolerably uniform width, tapering a little posteriorly; segments plump, the divisions well defined; there are a few scattered short hairs. Ground colour of the dorsal surface, a rather pale but warm purple; the head, and frontal and anal plates, intensely black. A broad pale yellow stripe extends throughout the dorsal area, dividing the black frontal plate into two sections; there is also a similarly coloured but much narrower line along the subdorsal region, and another one between this and the spiracles. Spiracles and tubercles minute, black; the hairs gray. Ventral surface uniformly pale yellowish green, with a few minute black tubercles.—GEO. T. PORRITT; Highroyd House, Huddersfield, April, 3, 1879.

TRYPHON SCABRICULUS, *Grav.*—Gravenhorst placed the male of this Ichneumon amongst the *Tryphonidæ*; Mr. Marshall in his list removed it to the *Pimplidæ*, as a doubtful species of *Phytodietus*; Dr. Vollenhoven in the last part of 'Pinacographia' (No. 7) figures the female under the generic name of *Ædemopsis*, Tschek., and says that it belongs to the *Tryphonidæ* and ought to come after *Eclytus*. I cannot help thinking that Marshall and Tschek are right, and that it ought to remain amongst the *Pimplidæ*, and in Holmgren's Sect. ii., A. a.+; I think the length of the aculeus prevents it being a *Tryphon*; but the object of my communication was not the discussion of its place in the list, but to call attention to what are either other species of this genus or varieties of a very variable species. I shall not minutely describe the insects, because Gravenhorst has already described the male (I. E. ii., 180), and there is a very good general figure of the female in Vollenhoven's plate 32, fig. 1, but only point out the differences of each variety. No. 1 (female).—Antennæ, fourteenth to eighteenth right hand joints white, the base of fourteenth and apex of eighteenth dark; fifteenth to eighteenth left hand are entirely white; the 1st segment of abdomen has no tubercles, gradually widens from base to apex, this latter twice as wide as the base; the 2nd segment about one and a half times longer than broad. This appears to be the variety figured by Vollenhoven; I have taken but one specimen. No. 2 (female).—I can detect no difference, but that the antennæ have no white ring. I have three specimens of this variety, and they vary slightly in the width of the apex of the 1st segment of the abdomen. No. 3 (female).—Antennæ, seventeenth and eighteenth joints white; 1st segment of abdomen with very projecting tubercles in about the middle of the segment; petiole gradually tapering to the tubercles: here it is about twice as wide as the base of the petiole; the post petiole a trifle longer than broad and only very slightly tapering; the 2nd segment has a node on each side rather in front of the basal third, the segment only very slightly longer than broad, almost quadrate. I have but one specimen of this variety: it is about 1 mm. longer than the two previous; they are 6—7 mm., and this is 8 mm. in length. No. 4 (male).—The first segment almost tapering and without tubercles; not quite twice as broad at the base as the apex; the 2nd segment nearly twice as long as broad; length 6.5 mm.

No. 5 (male).—The 1st segment of abdomen with projecting spiracles, but not quite so wide in the middle as No. 3; the second segment a little longer than broad; the apex of the 1st segment wider than No. 4; this (No. 5) and No. 3 more coarsely punctured, especially on the 1st segment. I cannot help thinking that No. 3 and No. 5 are male and female of one species (the male agrees with Gravenhorst's description); No. 1 and No. 2 may be only varieties of the original species; the colouring of all is very much alike, and so is the puncturing; the depressions between the lobes of the mesothorax are somewhat consute; the metathorax is coarsely rugose and has five areas, which are rather indistinct by reason of the roughness; the metathoracic spiracles are small and round.—JOHN B. BRIDGMAN; Norwich.

CATOPTRIA ÆMULANA.—Apropos of Mr. Machin's remarks about *Catoptria æmulana*, which appeared in the 'Entomologist' of last month (p. 109), while this day looking over a typical collection of European Tortrices made by the late Mr. Henry Doubleday, I noticed five specimens of the supposed variety of *C. æmulana*, which Mr. Machin and I have bred from blossoms of the golden rod (*Solidago virgaurea*). They were labelled, in Mr. Doubleday's own handwriting, *Catoptria decolorana*. These specimens were identical with our golden-rod friend.—E. G. MEEK; 56, Brompton Road, S.W., April, 1879.

[On referring to Dr. Wocke's list of the Micro-Lepidoptera of Europe, we find *C. decolorana* occurs in Germany and in Russia. We hope that during the coming season specimens of both forms may be reared and the larvæ described.—ED.]

BRILLIANCY OF FLOWER-HAUNTING INSECTS.—Mr. Grant Allen, in his interesting work 'The Colour Sense,' propounds the theory that there is a marked connection between the colour of animals—especially insects—and those of their food, brilliant species being in a majority of cases such as haunt flowers or feed upon fruits. Many of the instances he brings forward certainly support his position, but the exceptions seem too many and too formidable to be overlooked. Thus the *Chrysididæ*, probably the most beautiful family among the Hymenoptera, are rarely found amongst flowers. Our common *Chrysis ignita*, as Professor Westwood correctly remarks, haunts "walls, palings, and sand

banks." The *Scutelleridæ* (Hemipterous) feed upon the juices of leaves, as well as upon caterpillars, which they pierce with their sucking-tubes. Yet many of them vie in beauty with the most splendid Coleoptera. Mr. Allen adduces the *Cetoniadæ* and *Buprestidæ* in proof of his theory; yet in both these splendid families there are not merely numerous individuals, but even groups as dull and sombre as the generality of carnivorous or carrion-feeding beetles. *Oxythraca stictica*, *Aleorostictus variabilis* and *Valgus hemipterus* are totally devoid of gay coloration. The *Telephori* frequent flowers in search of *Aphides*, &c., yet their coloration is very plain and insignificant. Among Lepidoptera also, the *Sesiidæ*, though perfectly diurnal and flower-haunting, make little display of colour. Nor can all the true butterflies boast of great beauty, as witness certain species of *Hipparchia* and *Erebia*, which yet feed upon the nectar of flowers. Finally, I may mention the gay hues displayed by certain Orthoptera which are by no means in the habit of frequenting, or feeding upon, flowers. Hence I submit that, as far as insects are concerned, Mr. Allen's views, though decidedly suggestive, can scarcely be definitely accepted.—C. R. SLATER; Bicester Road, Aylesbury.

GALL ON THE GREAT KNAPWEED.—At vol. x., p. 124, of the 'Entomologist' I described and figured a gall on the pinnatifid leaf of the great knapweed (*Centaurea scabiosa*) as that of *Diastrophus* (*Isocolus*) *scabiosæ*, Gir. I lately sent the imago, bred from this gall, to Dr. Mayr, who returns it as certainly a new species between *D. scabiosæ* and *D. areolatus*. The true *D. scabiosæ* makes a multilocular gall on the knapweed stalk; the gall of this new species is unilocular, and occurs on the leaf-stalk or midrib. My single specimen came from Topley Pike, near Buxton, and I now call attention to it in the hope that it may be recognised if again met with. I should be thankful for fresh specimens.—EDWARD A. FITCH; Maldon, Essex.

BLACK ENTOMOLOGICAL PINS.—We can fully endorse Mr. Farn's remarks on the use of black entomological pins, never having met with an instance in which a specimen pinned by one of these enamelled pins has been destroyed by verdigris. Another great advantage is that the wings are less liable to "spring" than when the ordinary pins are used. The black colour and very small heads make these pins scarcely noticeable in the collection. We would

suggest, as most suitable, No. 20 for small Tineæ; Nos. 18 and 10 for large Tineæ and Tortrices; Nos. 10 and 15 for Geometers; and Nos. 8 and 5 for the Noctuæ.—ED.

REVIEWS.

The Transactions of the Entomological Society of London, for the year 1878.

JUDGED by quantity or bulk the volume for 1878 must yield to its predecessors, as it contains but 335+88 pages and six plates against 439+93 pages and ten plates in the volume for 1877, 655+87 and twelve plates for 1876, 342+68 and nine plates for 1875, and 548+70 and eleven plates for 1874. Judged by the more severe test of quality it can hardly be said to equal, certainly not altogether to surpass, any of the last few volumes. In the Transactions of a society like the Entomological it is quite idle to expect them to maintain a given standard of excellence; as here, so in other cases, certain important and interesting memoirs come spontaneously and irregularly, not in answer to any given call or need.

There is still much to learn from the volume for 1878, and to that we more particularly limit ourselves, the present article being intended more as a digest than for a review. Thirty-one memoirs, from nineteen contributors, are printed—a larger number than has appeared in any volume since the first of the 3rd series (1862-4); twenty-one of these relate to descriptions and lists of exotic species. Classification is the subject of one; habits and economy, five. There is one on structural peculiarities—the hairs of bees—which may be useful in throwing light both on economy and classification; two concerning the colour and forms of larvæ, which come somewhat indirectly within the now wide range of Darwinism, and one on practical Entomology. This last is a short paper by Miss E. A. Ormerod, on “The Prevention of Insect Injury by the use of Phenol Preparations.” A detailed account of how the use of the preparation checked an attack from the “rust” fly (*Psila rosæ*) in the carrot, is given. The two papers bearing on the great natural selection theory tend altogether to bear out the views of Wallace, Darwin, Weismann, and others, viz., that, as a general rule, edible caterpillars are dull or

protectively coloured, whilst inedible ones are often brightly and conspicuously coloured. In support of these views Sir John Lubbock has examined the Macro-Lepidoptera, and Mr. P. Cameron the Tenthredinidæ, showing that both the sawfly and lepidopterous larvæ have great similarity in their variation. Mr. E. Saunders' short observations on the hairs of British aculeate Hymenoptera are altogether original, and their importance will probably be recognised at some future period.

Of the twenty-one descriptive papers, twelve belong to the Coleoptera, two each to the Hymenoptera, Hemiptera, and Neuroptera; and one each to the Lepidoptera, Arachnida, and Myriopoda; but none call for any special notice here. The single memoir on classification is one in which Mr. A. G. Butler has attempted to show that the natural location of the *Ægeriidæ* ("clear-wing" Lepidoptera) is between the *Pyræles* and the *Gelechiidæ*; this is novel, but the arguments are well worked out and fully illustrated with a plate, so that no doubt they will receive the attention from systematists which they appear to deserve. We now come to five memoirs of more general interest, those relating to habits and economy. Last year we had occasion to notice one of Mr. Mansel Weale's papers on South African insects, which had almost exclusive reference to the Lepidoptera; this year "protective resemblance" seems to be still the key-note, and many instances of undoubted mimicry are faithfully recorded. Dr. Fritz Müller strikes a similar chord from Brazil, but more especially enlarges on the "odours emitted by" and "sound made by" various Lepidoptera. Professor Wood-Mason contributes four short notes on the structure and habits of various *Mantidæ*, and Mr. Dunning gives a digest of Ritsema's recently published paper on the life-history of *Acentropus* (Tijd. v. Ent. 1878). This is a favourite theme of Mr. Dunning's, and he has the satisfaction of seeing several of his conclusions independently confirmed. Sir Sidney S. Saunders has contributed a memoir on those very remarkable and somewhat abnormal Hymenoptera which inhabit various figs and assist in their caprification. Even considered apart from their life-history they are most interesting, but altogether we greatly wish for more information from M. Lichtenstein (who supplied Sir S. Saunders with his material) or some other competent source. Newman published a note in the 'Entomologist' on similar insects, founded on Walker's digest

of Dr. Coquerel's observations (Entom. v. 399); and there is also a posthumous, but incomplete, one of Walker's, containing descriptions of other and allied species (Entom. viii. 15). In Sir S. Saunders' present memoir, a history of the *Agaonidæ* is given, and the altogether abnormal and apterous male is described as the partner of Westwood's ordinary-looking, chalcideous *Sycophaga crassipes*.

The meetings of the Society during the last year were well attended. Several interesting exhibitions were made, and some important discussions and remarks on these and on papers read were elicited, notably on Sir John Lubbock's paper and on several other phases of protective resemblance brought up through various exhibitions. The Proceedings for 1878 will therefore be found to contain much both of scientific and general interest. The minor papers included are:—Further notes on various insects, both from Dr. Fritz Müller and Mr. J. P. Mansel Weale; these respectively from Brazil and South Africa. The Rev. T. A. Marshall's "Notes on the Entomology of the Windward Islands" contain many interesting remarks on the habits of various insects, besides giving a list of all the species noticed and included in the collection sent to the Society. Mr. J. W. Slater contributes some remarks "On the Secondary Sexual Characters of Insects," and Mr. A. H. Swinton "On the Expression of the Emotions by Insects." M. Lichtenstein submitted a digest of his researches into the cycle of life of "*Phylloxera vastatrix* and other Plant-lice." Mr. Dunning read a "Note on Spiders resembling Flowers;" and there is Mr. McLachlan's report on the condition of the Linnean Collection, occasioned through some remarks from the late Mr. F. Smith; together with the report of the Committee (Messrs. M'Lachlan and Waterhouse) on the ravages of *Anisoplia austriaca* amongst the corn crops of South Russia. This last was in answer to a report sent home by the late Mr. Carruthers (Her Majesty's Consul at Taganrog), and was transmitted to the Society through the Board of Trade. This is a move in the right direction, which we hope will be followed when information is again required on injurious or other insects.

Many other objects and facts were brought before the Society's notice, such as sexual dimorphism in *Erebia Medea*, by Mr. H. Goss; the "jumping seeds" inhabited by the larvæ of *Carpocapsa*

saltitans, by Mr. J. Spiller; *Cetonia aurata* and a lepidopterous larva (*cf.* Entom. v. 185, 200) as potato enemies, and various insect monstrosities, by Prof. Westwood; together with two or three general collections from various localities, many rare species of British Lepidoptera and Coleoptera, and several examples of colour and other variations in Lepidoptera, &c., but they cannot be referred to here.

From this varied summary it will be seen that the Entomological Society continues to do good work in several directions, and well deserves the support of all entomologists. The advantages of membership held out are great, and we hope that Mr. Bates' appeal in his presidential address may have the effect of attracting many of "the notoriously large number of entomologists in the United Kingdom, who hold aloof from us," to join its ranks; also that many other of Mr. Bates' valuable suggestions may bear good fruit. The following are the officers and council elected for this year:—President, Sir John Lubbock; Treasurer, J. Jenner Weir; Librarian, F. Grut; Secretaries, R. Meldola and W. L. Distant; other members of Council—H. W. Bates, J. W. Dunning, Rev. A. E. Eaton, E. A. Fitch, E. Saunders, F. Smith, S. Stevens, and J. Wood-Mason.—E. A. F.

Species des Hyménoptères d'Europe et d'Algérie. Par ED. ANDRÉ, chez l'auteur, à Beaune (Côte-d'Or). 1879.

A SHORT time since we received the prospectus of this work. The project was, we feared, almost too good. It aimed at producing a series of monographs on the different families of Hymenoptera, illustrated with coloured figures of one or more species of each genus, accompanied with full biological history, and simple dichotomous tables of the species. These were to appear in periodical form, and were eventually to form a complete work on the European Hymenoptera. It was to be a subscription work, and to appear in quarterly parts, each of which is to contain eighty octavo pages of letterpress and three plates. It is written in French; and the price of the four numbers, or the yearly subscription, is now 18 francs (= 14s. 6d.) for the Postal Union. It was proposed to commence with an exhaustive Introduction, and then to follow on with the *Tenthredinidæ* (sawflies).

Such was the scheme which has soon been carried into effect.

The subscription list was to close on January 15th, 1879, and we have just (March 27th) received the first part. This is of the promised size, and three plain plates very clearly illustrate the structure of the head, antennæ, and thorax. The Introduction commences with a few pages on Entomology in general, but soon proceeds to the Hymenoptera in particular. The subjects already treated of—viz., collection, preservation, and structure—are well and concisely considered; and we sincerely hope that this homely work will not fall short of the ideal which is attempted. Homely, because dedicated “à la mémoire de mon père, à ma mère,” and printed “chez l’auteur,” who promises that “all my time, all my efforts and all my will, both are now and ever will be at the service of this work; which will be the work of my life.”

We heartily wish M. André may be enabled to carry out his good intentions, and bring the work to a successful completion. Other methods of publication might have been preferable; but the necessity for a competent work on European Hymenoptera is great; and we hope that this labour of love may not have been undertaken in vain.—E. A. F.

Notes of Observations of Injurious Insects. Report, 1878.
London: West, Newman & Co., 1879.

THE present report shows that this praiseworthy undertaking continues to meet with success. Much more, however, might be accomplished; and we look upon it as almost a duty for practical entomologists to support Miss E. A. Ormerod, and to favour her or her colleagues with the results of their observations. The twenty-seven pages of the 1878 report contain much valuable information; and we see that in addition to the hitherto sixteen specially noted species, five others are to be included. These well-known destructives are two craneflies (*Tipulæ*) and three weevils (*Otiorhynchus*, *Bruchus*, and *Sitones*).

It has been said that insect injury in Britain is so slight that it is unnecessary to seek its limitation. Many practical farmers will, we fancy, hardly endorse this opinion; and even if they did, surely the easier the task the greater the discredit both to British entomologists and to British agriculturists for the negligent performance of it. Miss Ormerod's disinterested labours are happily turned in this direction, and deserve, if they cannot command, every success.—E. A. F.

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[No. 193.

CONSIDERATIONS AS TO EFFECTS OF TEMPERATURE ON INSECT DEVELOPMENT.

By E. A. ORMEROD, F.M.S.

IN the great difficulty of gaining information as to circumstances accompanying insect appearance in abnormal quantity, it seems worth while to consider whether something more might not be learnt about insect life (as it most certainly might about plant life) by greater observation of ground temperatures. There are certain atmospheric conditions, both as to amount of moisture and warmth, well known to entomologists, and which can be proved to affect development in various ways, but the popular ideas on these matters (and, unfortunately, too often amongst those most practically concerned in their effects) frequently lead exactly in the wrong direction; if we could, therefore, gain some exact data of temperature at the surface of the ground and a foot or two beneath it (as far down, that is, as insect presence might be presumed usually to exist), it might be very useful.

With regard to simple continuance of larval existence during cold as severe and as long continued as it can be ordinarily subjected to in this country, the last winter showed us that the larvæ of many of our various injurious insects (and notably those of *Cetonia aurata*, the rose chafer, which, from its succulent nature and great size might be supposed both to feel and to show injuries from frost very readily) are to all appearance uninjured by a temperature low enough to freeze the ground into a firm mass, and ranging from somewhat below nine degrees (that is, twenty-three degrees of frost) on the ground level, to about thirty-two degrees (that is, what is commonly known as freezing)

at a foot beneath the surface. But looking on from the mere existence (uninjured) of the larvæ through winter cold, to the conditions of summer vitality, when feeding, growth and change of form are in active progress, we can lay our hands at once on proof of circumstances of temperature cooler than suit the constitution of the grub, in some cases retarding the date, or interfering with the healthiness of its development.

We greatly need to know, for practical purposes, what these temperatures are, for it does not seem at all admissible to apply a general rule. In the case of the much-vexed¹ question of the Colorado Beetle, we have information (pages 2 and 3 of the 'Seventh Annual Report on the Insects of Missouri,' by C. V. Riley) that the crop was entirely free from injury by these insects above the altitude of about eight thousand feet. The bodies and eggs, and recently hatched larvæ, were to be found, but dried and dead, "which is probably due to the very dry atmosphere in connection with cool nights." With some noticeable lepidopterous and dipterous examples the rate and healthiness of development may be traced in parallel sequence with the amount of accommodation (so to call it) afforded according to their constitutions during the time of rapid larval growth, or pupation; but it is very difficult to proceed onwards as to what may happen to species not easily noticeable, from the transformations taking place under ground. We have a well-known instance, however, amongst the ants (easy to be observed in *Formica rufa*) of the undeveloped insects being constantly moved so as to secure them the greatest available amount of sun-warmth by day and ground-warmth by night; and though, perhaps, I should ask to be excused in taking up time and space in what may be mere conjecture, yet it seems not impossible that observations of temperature on the ground level, and also taken with earth thermometers at the depth of one foot, and of two feet, beneath the surface, might throw some light on the causes for the varying depth at which larvæ of one species may occur (with consequently varying opportunities of mischief); on retardation of development, or the contrary; and many other matters, which would be serviceable as well as interesting.

In the case of the somewhat rare beetle, *Clythra quadripunctata* (the parasite or inquiline in the nests of *Formica rufa*), and of the still rarer *Rhipiphorus paradoxus* (parasitic in the

larvæ of *Vespa vulgaris*), I have met in each case with a single instance of their appearance in such unusual numbers in circumstances of unusually raised temperature, or protection from external influences, that perhaps some of the details may be worth noting.

The *Clythra quadripunctata* is said, by Stephens (Brit. Ent. iv. 354), to be not uncommon in certain places within the metropolitan district; but at Sedbury, in West Gloucestershire, where I found this beetle in great numbers towards the end of April, 1872, I had only seen two specimens previously, though the fir wood abounded with nests of the wood ant, and I was in the constant habit of observation. The nest from which the *Clythra* appeared was quite exceptional in size, being nine paces, of nearly a yard each, in circumference, and was formed (not in or on a decayed stump) simply of sticks and rubbish piled in a great heap on the grass just outside the wood, where it was exposed to rain and (during about half the day) to sunshine.

On the 24th of April I found the *Clythra* in great numbers, mostly in pairs, on the grass by the nest; and they continued to appear so numerous on that and the following days that I took thirty at a time, and returning again and again at short intervals, found them still appearing—far more than I cared to take. Being desirous of making out the locality of the larvæ and pupæ, I went to the nest about 10 a.m., before the ant-cocoons had been brought up for the day, and, opening the mass carefully downwards with my hands till I came to what may be termed the nursery of the nest, there, amongst the ant-cocoons and larvæ, I found the flask-like cocoons of the *Clythra* in great numbers, formed, as far as I was able to judge by their texture, of minute morsels of the surrounding matter (chiefly vegetable *débris* from small sticks) glued together by the larvæ. Some of the beetles were still not advanced beyond the larval stage, lying curled like small cockchafer grubs in their cases; and, from the much-gnawed state of a few of the ant-cocoons after the beetle larvæ had been confined amongst them for a night, I conjecture *Clythra quadripunctata*, in its larval state, to be carnivorous. Kaltenbach ('Pflanzenfeinde,' p. 612) mentions that the larva of this species is, according to Dr. Rosenhauer, found in ants' nests, and is "fostered there by the ants"; but as far as I could judge from

this instance, the cares of the fosterers, if voluntary, were very ill repaid.

The chief matter, however, was the temperature. On first examining the nest, I passed my bare arm well down to a considerable depth, and found the centre of the mass of material so warm that I withdrew it hastily, thinking I might have put it in the lair of some animal. I do not know what amount of heat usually exists in the centre of the wood ants' nests (as far as I have observed, they usually have a temperature raised in some degree above the outer air), but in this case the great mass of material capable of some degree of fermentation, heaped together where it was exposed to strong sunlight and the coincidences of thundery weather, would account for the much greater warmth. I had not a thermometer with me, but a temperature that feels strikingly warm to the arm, itself raised in temperature by much exertion, must be considerable, and by such tests as I could apply afterwards with a thermometer at hand, I estimated it to be about seventy degrees. This was at about two feet beneath the surface of the nest, and would give a temperature more than twenty degrees above what has been shown here (in the neighbourhood of Isleworth during April of this year) by earth thermometers at one foot and two feet beneath the surface; or, taking one of the warm months of the year as a general guide to earth temperatures, about ten to fifteen degrees above the amount shown at the same depth during last September.

The appearance may, of course, have been only coincidental; but still, looking at the unusual amount of protection from external chills, and also the unusual amount of internal warmth, in connection with the enormous numbers of the *Clythra* where they were usually scarcely represented, it may be worth recording.

With regard to the *Rhipiphorus paradoxus*, I found this beetle present in great numbers early in September, 1870, in a large nest of *Vespa vulgaris*, and being at the time securing all the specimens I could meet with for presentation to the Collection of Economic Entomology then forming at South Kensington, I had the opportunity in clearing the combs, cell by cell, of accurately observing their contents. The nest was of unusual size and in a very dry and warm situation, as well from the general formation of the ground as from being in well-kept grass land in the park

at Sedbury, Gloucestershire, without any overshadowing from trees or bushes; the special locality was partly in the stones of a rough dry drain, partly in hard lias clay at about a foot beneath the surface, and three feet from the opening of its gallery-thoroughfare. It contained six or more combs of more than a foot in diameter, the later ones being irregularly made as if under some disturbing influence (as I have found them in a deserted nest of the tree-wasp); and in these, with the exception of one or two developed beetles, I did not find any specimens of *Rhipiphori*. In the other combs—those composed of workers' cells—I found great numbers of *Rhipiphori* in various stages of pupal condition, from the earliest state, still white and soft, to the appearance of colour, and onwards to full development. Their number was beyond what I could calculate. The wasp-comb being required cleared of living contents, I went over each comb with a pair of pointed forceps, tearing the caps off each of the cells and removing the contents, and had thus a complete opportunity of inspection; and the *Rhipiphori*, being plentifully scattered in all parts of all the small-celled combs, must have been exceedingly numerous.

In the few cells which I left unopened in all the combs (for purposes of further confirmation of my own observations), and forwarded to Mr. A. Murray, he informed me that he found from sixty to seventy specimens of *Rhipiphori* developed or still as pupæ. These combs and illustrative specimens are (unless recently removed) still to be seen in Case LVIII. of the Collection of Economic Entomology at Bethnal Green.

As with the *Clythra*, the appearance of the *Rhipiphorus* may have been dependent on many unknown circumstances, still it is in striking coincidence with apparent fostering protection afforded by the abnormal state of the containing nests.

The extraordinary ignorance and perversion, or absolute inversion of correctness, in the views prevalent with many on insect development, make the popular ideas on these subjects unfortunately of little value; still there is sometimes a foundation (though not necessarily the supposed one) for a widespread belief; and it would be a most useful and acceptable addition to our information, if (after the recent severe winter and spring, still, at the beginning of May accompanied by temperatures reaching little above twenty degrees at the ground level) we

could have reports during the coming season of the dates of general appearance, the quantity, and condition of the ordinary farm insects; and also whether, in garden and farm operations, the larvæ are found at lower depths than is usually the case.

Unnatural circumstances, whether of temperature or surrounding conditions, are almost certainly prejudicial to life, or at least to health; and the cold which causes a larva capable of voluntary motion to bury itself beyond the usual depth, puts it in unusual circumstances as to atmospheric effect, moisture, food, and other matters calculated in some cases to retard development, in some to militate against its return in imago form to the surface.

It appears possible that in these abnormal conditions we might find the clue to the (at present) unaccounted-for appearance or absence of many of our insects; and, if I may be allowed to prefer the request, I should like to mention the pleasure it would give me to be favoured, in the course of the season, with any notes on these points, which, by collation with those of temperature, and comparison with those of other districts, could not fail to be a most valuable addition to the information which I trust the coming season will supply on the subject of the presence of "Injurious Insects."

Dunster Lodge, near Isleworth, May 2, 1879.

NOTE ON THE HABITS OF *RANATRA LINEARIS*.

By ABBOTT G. LAKER.

DURING the last few months I have had the opportunity of observing the habits of *Ranatra linearis* in its imago stage, and a note of the peculiarities of this curious insect may be of interest. It is very slow and sluggish in its movements, and will cling to the weeds, generally at a depth of only a few inches under water, but sometimes close to the surface, for hours together; remaining perfectly still except when it rises to breathe, and even then it only moves just sufficiently to enable it to protrude the tip of its anal filament slightly from the water, and after taking a fresh supply of air immediately it crawls down again and remains stationary as before. Even this limited degree of motion is not necessarily often repeated, for (from

observations during November) I find that the intervals between each inspiration vary from a few minutes to as long a time as fifty-six or sixty minutes, the average time being something over half-an-hour. The usual position is with the head downwards, the body being held in a slanting or almost vertical position. Occasionally the body is carried horizontally, but I do not remember ever to have seen a *Ranatra* resting with its head uppermost.

The movements to the surface are usually effected by the insect crawling slowly backwards, directing its motion upwards by means of its long legs, with which it contrives to grasp the aquatic plants. It will, however, occasionally let go its support and float to the surface, by the lightness of its body, but this is commonly only done when the tail has become obstructed by the weeds with which it is surrounded.

Notwithstanding its slight specific gravity and the form of the legs, which are ill adapted for such progress, the *Ranatra* can swim downwards through the water, but only slowly and with apparent difficulty, moving its second and third pair of legs in unison; when the second pair are moved forward the hind legs are projected backwards: but although the tibiæ of the middle and posterior legs are fringed with two rows of short hairs, these members seem to offer a good deal of resistance to the water.

In swimming the fore legs are of little or no assistance, being only used occasionally to grasp objects within the reach of the long claw-like tibiæ and tarsi; indeed the purpose served by the fore legs seems to be to catch and hold prey, and the claws are sometimes employed as combs to remove any impurities about the head and neck; but as predatory organs they are most effective. Their action in seizing an insect is quick and decisive; indeed it is only in this act and in warding off the approach of an object of alarm with these same members that anything like celerity of movement is to be observed in *Ranatra linearis*, except, perhaps, in flight, which I have not witnessed. When taken out of water and placed on any rough substance the *Ranatra* walks slowly and somewhat awkwardly, using the second and third pairs of legs in pairs as in swimming, carrying the body high from the surface over which the insect is progressing. The fore legs are admirably adapted for holding small insects. The flattened femur is grooved along one edge and the raised margins

of the groove are set with small teeth something like those of a saw; the tibia and tarsus slants down into the canaliculated femur, the former being roughened. The inner rim on the femur where the tarsus comes, when the claw is closed, is raised into a small triangular spike, and this would seem to be of service as a catch and support for any object which, from its size, prevents the tibia and tarsus from fitting down into the groove in the femur. I have been much struck with the firmness of the grasp on its prey obtained by this insect: on one occasion I placed some sticklebacks in the glass with a *Ranatra*, when one of them, about an inch long, was seized (the total length of the *Ranatra*, exclusive of its anal filament, being only eighteen lines), and notwithstanding the fish's repeated and vigorous struggles it was held fast. I then took hold of the stickleback and raised it out of the water: the *Ranatra*, however, would not let go, and was drawn out of the water with the fish. I forcibly separated the two, replaced the insect, and, immediately afterwards, the fish; but the latter was again seized in a very short time, and the insect continued its meal. The entire absence of fear displayed under unusual circumstances by the *Ranatra* (in common with most other water insects) is noteworthy, and on one occasion a *Ranatra* placed, soon after capture, in a vessel of water, within a short time commenced feeding.

The *Ranatra* never seems to move in search of food; it waits patiently, with its fore legs extended, ready to seize any small insects coming within its reach; it is not by any means voracious, and a specimen which I have kept for about six months, feeding it chiefly on blood-worms, often refuses its food altogether; and, even if a blood-worm is presented to it, so that it is grasped by the *Ranatra* the latter will often release the larva; at other times it will readily take the proffered object and continue to suck its juices until nothing but the skin of the blood-worm appears; this occupation occupies generally about two hours, and a blood-worm a day, or even less, seems to satisfy the requirements of the insect. These observations refer to November and December: its rapacity may be greater during the warmer months. I have seen a *Ranatra* seize and kill a diving spider (*Argyroneta aquatica*), and I have fed it on *Notonectæ*. It has also seized small water-beetles, such as *Hyphidrus ovatus* and, in this case, it turns the beetle round and round, as though to find a weak part,

and applies its rostrum to the extremity of the abdomen of its victim, but whether the *Ranatra* succeeds in killing the beetle I am not aware. I have kept a *Ranatra* in the same vessel with *Dytiscus marginalis* for a week or two together without the latter attacking it, although they have repeatedly come into actual contact; but it is quite probable that if the *Dytisci* were hungry they would make short work of the *Ranatra*, as they do of *Notonectæ*, *Corixæ*, &c., on occasion. The curiously lengthened and flattened form of *Ranatra linearis*, together with its yellowish brown colour and its habit of remaining motionless and in a slanting position among the grass-stalks or water-weeds in its natural ponds, render it somewhat difficult of detection in such situations; I have wondered whether these peculiarities are a protection to the insect, from which its slow movements would not enable it to escape, but I have not been able to discover any water animal that it has to guard against. I may, however, mention that when a *Dytiscus marginalis* comes in contact with the *Ranatra*, the latter raises its fore legs as though to ward off the beetle.

The imago, which I have kept within doors from June to the present time, shows no signs of torpidity during the winter months, and I have taken a specimen of *Ranatra linearis* from a pond on March 9th, from which I should infer that it may be found active during the whole of the year.

Clunie House, Court Hill Road, Lewisham.

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant-Naturalist in Museum of Science and Art, Dublin.

No. XIV. NYMPHALIDÆ—NYMPHALINÆ.

(CALLIZONA to PYRRHOGYRA.)

WE are still treating exclusively of South American species; and the three next genera, *Callizona*, *Gynæcia* and *Ectima* are widely distributed, though very poor in species, and are closely related to each other. Their habits are all very similar, and they are very fond of settling on the trunks of trees, though *Ectima* expands its wings flat, and the others sit with their wings raised. *Gynæcia Dirce* is the commonest and most widely distributed of

the group, ranging over the greater part of South and Central America. It is a rather robust-looking insect, and expands from two to nearly three inches. The wings are entire, the fore wings triangular and obtusely pointed, on account of the hind margin running rather obliquely to the hinder angle. The costa and hind margin of the hind wings form almost a right angle with the apex rounded off, and there is a projecting lobe at the anal angle. The wings are uniform brown, and the fore wings are crossed by an oblique bar, varying from pale yellow to dull orange, running from the middle of the costa to the hind margin, just before the hinder angle; the tip of the wing is blackish. On the under side the transverse band is paler, and the whole of the wings are beautifully striped and reticulated with brown and grey. The hind wings are bordered with yellow, intersected by a brown streak; the lobe is marked by a black spot pupilled with blue; and the outer portions of all the wings are crossed by indistinct traces of a row of eyes with blue pupils, which are best marked towards the tip of the hind wings.

Callizona Acesta, and the species or varieties which have lately been separated from it, are smaller insects, rarely expanding as much as two inches; and the hind wings are rounded. They are tawny, with obscure dark transverse lines, and the outer half of the fore wings is obliquely black, with an oblique yellow stripe within it, and some white or yellow spots nearer the tip. The fore wings are tawny, striped with black towards the base, and black towards the tip, with the oblique stripe and some yellow markings beyond; the under side of the hind wings is pearly grey with brown transverse bands, and is thus very similar to that of *G. Dirce*.

The species of *Ectima* are smaller insects, expanding about an inch and a half. They are brown, with darker transverse lines, and there is an oblique white band on the fore wings; nearer the tip are generally some small white spots on a black ground, but scarcely forming well-marked eyes. There is sometimes a row of similar white dots on the outer portion of the hind wings, which are drab beneath, with some slight transverse brown markings. *E. Iona* is glossed with purple above.

The species of *Pandora* are large insects, expanding about three inches. The wings are not dentated, but the hind margin of the fore wings is more or less concave. They are black, with a

brassy green band beyond the middle on all the wings; towards the base they are darker green, intersected by numerous rather broad black lines. The under side of the hind wings is of some shade of red; sometimes spotless, and sometimes with transverse lines, and a submarginal row of black dots or rings. They inhabit the west of South America, and Mr. Bates describes their flight as very rapid.

Batesia Hypochlora, and its allies or varieties, are still larger and more splendid insects from the Upper Amazon and Ecuador. The fore wings are black, with the basal third blue, and a very large red oval transverse spot or band running from below the costa three-quarters of the distance to the hinder angle. The hind wings are blue above, with a submarginal and rather narrow black band; beneath they are olive-yellow, or greenish, with the submarginal black stripe narrower than above. I have no information respecting their habits.

The genus *Ageronia* contains many common and well-known species from Tropical America. It was at first formed into a separate family, and was placed by Doubleday between the *Pieridæ* and *Danaidæ*, owing to an erroneous statement that the pupæ were attached like those of the *Papilionidæ* and *Pieridæ*. But Mr. Bates discovered that the pupæ were suspended by the tail; and *Ageronia* was then removed to the *Nymphalidæ*. The perfect insects frequent forests, and are remarkable for the cracking noise they make with their wings during flight, a peculiarity first noticed and recorded by Mr. Darwin. The butterflies expand from two to three inches; the fore wings are generally rather short, with the hind margin very slightly concave, and the hind margin of the hind wings slightly dentated. They are mottled with black, bluish, and white, and are sometimes marked with dull reddish spots; and there is generally a submarginal row of black eyes, with white pupils on the hind wings. Some species are velvety black above, spotted with blue; or very deep blue, spotted with paler, and with an oblique white band on the fore wings in the females. The under surface of the hind wings varies from pale silvery grey, with a row of submarginal brown rings, bordered on each side with a brown line, to yellow, red, brown, or steel-blue; spotted with red in various species.

The genus *Didonis* contains a few brown butterflies, expanding about two and a half inches, with the hind margin of the fore

wings rounded, and that of the hind wings dentated. The hind wings are marked with a conspicuous red submarginal band, and are spotted with red at the base beneath. The species are all from Tropical America, and greatly resemble each other.

The species of *Olina* have much resemblance to the Danaid genus, *Ithomia*, and expand about two inches and a half. Their wings are long and entire, brown or black, with white basal stripes, and large white spots beyond them on the fore wings, and with a white stripe varying in breadth crossing the hind wings, which are also crossed near the base by the basal streak, when it runs obliquely and extends to them. On the under surface the wings are partly bordered and crossed by narrow rufous stripes, as in various *Ithomiæ*. They inhabit the Amazon district, Bolivia, &c.

The genus *Cystineura* contains a few small species, the largest of which expand less than two inches. The fore wings are long and the hind margin much curved, so that they form an obtuse-angled triangle, with the costa much longer than the inner margin. The hind wings are rounded and slightly dentated; they are varied with pale brown, white, and orange, and there is always a white band across the hind wings beneath, divided by the nervures, and frequently more or less visible on the upper side. The species are found in the West Indies and North America. One of the prettiest is *C. Dorcas*, which is white, with the upper part of the fore wings liver-coloured, with a long orange spot at the base of the costa, and an orange line at the end of the cell; and all the wings broadly bordered with orange.

The genus *Lucinia* only includes two West Indian species, expanding nearly two inches. They resemble the genus *Catagramma* in appearance, being orange or pale red above, with the tip of the fore wings black, with a large spot of the ground colour. There is a black blotch near the hinder angle, and another at the end of the cell. On the under side, also, they much resemble *Catagramma*, the hind wings being marked with two large eyes in a similar manner; but they may be at once distinguished from anything resembling them by the strongly dentated hind wings.

Pyrrhogyra, the last genus we shall notice in the present paper, contains several common South American species, which show some resemblance to *Limenitis*; they expand about two

inches, or a little more or less; but the wings are broad, the hind margin of the fore wings slightly concave, and the hind wings dentated, and sometimes with a projecting tooth in the middle. They are black, with a broad white or green band across the middle of both wings, divided in two on the fore wings, and with a smaller spot of the same colour nearer the tip. The pale markings are bordered beneath with brown borders, divided with red, and there is a red spot at the anal angle of the hind wings, except in the smallest species, *P. Irene*, which is black and white above without any shade of green, and the white markings are bordered below with black and tawny instead of red. All the genera in this paper are South American.

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of DR. S. C. SNELLEN VAN VOLLENHOVEN,

By J. W. MAY.

(Continued from p. 106.)

SELANDRIA CEREIPES, *Voll.*

Larva and imago unknown.

Selandria nigra nitida, clypeo et cenchris albis, pedibus cereis, areola lanceolata aperta.

Long. 6 mm. Exp. al. 13 mm.

This new species is, without doubt, most nearly related to *Selandria stramineipes*, Klug., which is described in 'der Gesellschaft naturforschender Freunde zu Berlin Magazin,' Achter Jahrg. p. 75 at No. 62, and is also mentioned by Hartig in his well-known work on sawflies, at page 282. Our species is so nearly allied to the German insect that I was for a long time in doubt whether it should not be considered as a variety of the latter. I have, however, come to the conclusion that the difference is sufficiently great to be accepted as establishing a specific distinction. For my acquaintance with both larva and imago I am indebted to my friend, Mr. E. E. de Roo van Westmaas, who sent me several larvæ, in various stages of growth, on the 26th August, 1869, which he had taken on *Lastrea Filix-mas*. Three of these larvæ, at different stages, are represented at fig. 1, of the natural size and colour; it will be

seen that some were reddish yellow, some greenish yellow, and others green. The largest of those I had was 14 mm. long, and from this example I have drawn up the following description:—Head round and shining, sordid brownish yellow, partially withdrawn into the first segment; mouth somewhat darker in colour, tips of the jaws brown; eyes placed in rather large round black spots. Body strongly wrinkled on the dorsum and regularly decreasing in thickness from the head backwards, colour yellowish green, darker on the dorsum as far as the line of stigmata; the margins of these latter were of a darker tint, but were difficult to make out; they appeared to me to be elliptic in outline. There were twenty-two legs, the six prolegs being glassy yellow and having the claws brown. Neither spines nor other processes were observable near the anal valve.

In some few examples the head was greenish gray; in some a line of a lighter tint, but somewhat darker at the sides, extended along the middle of the dorsum; in others the dorsal line was of a purple tint; the one figured was entirely without any dorsal line, and this was the case with most of the larvæ. My larvæ for the most part spun up in the mixture of sand and mould covering the bottom of the glass in which I had kept them; in the following year, however, nothing appeared from these cocoons, on opening one of which a shrivelled larva was found nearly dead, as represented, enlarged, at fig. 4.

I should now have been quite unable to give any further particulars about this species, had it not been for the kindness of my friend De Roo in communicating to me the results of his more successful attempt at rearing it. On the 11th July, 1870, I received from him twelve imagos which he had reared, together with a couple of cocoons: the latter resembling those which I had, still unhatched.

The cocoons (fig. 3) are single, rather hard, of a dark brown tint, covered externally with grains of sand, smooth and very shining on the inside. On sending me the insects Mr. de Roo wrote to me that the first imagos appeared on the 19th and 20th June, a large number coming out on the latter date; others appeared afterwards from time to time up to the 10th July, when the last was hatched.

The following is a description of the perfect insect:—Head broad, and, considering the size of the body, large, shining black;

on the forehead was a very smooth oval spot. Antennæ nine-jointed, black, as long as the thorax, and covered with extremely fine hairs. Eyes black, rather large and projecting; ocelli topaz-coloured. Labrum, and in many cases also the somewhat emarginate border of the clypeus, white; mandibles black, the remaining parts of the mouth yellow. Thorax without hairs, shining black, with the extremities of the collar and the tegulæ pale yellow. Wings very slightly clouded, iridescent (especially in the live insect), yellow at the insertion; nervures and stigma brown, the latter being of an obscure yellow tint below at the insertion, the second submarginal cell without a horny spot. Cenchri greyish white. Abdomen broad, shining black with an open triangular space at the base on the dorsum; some indistinct white spots at the sides of the anus. Legs yellow, with the exception of the terminal joints of the tarsi and the claws, which are brown.

I am not as yet acquainted with the male of this species, which appeared to us to be single-brooded, and which has hitherto been observed only in the province of Gelderland.

ENTOMOLOGICAL RAMBLES, 1878.

By J. B. HODGKINSON.

(Concluded from p. 128.)

ON another visit to Arnside the last week in June, larva-hunting among the young oaks, I took what I expected to be *Ypsolopha lucella*, but I was disappointed. I worked away and got a few scores, and they all came out *Hypolepia radiatella*. Then, noticing the young oaks quite yellow and withered in great bunches, the leaves being drawn together so oddly that I thought *Tortrix viridana* could never have done work of this sort, I opened some of these bunches, examined the larvæ, and was sure they must be a knot-horn; so, on the strength of this idea, I filled my large inside pockets and took them home, threw them on my room floor, having out-reasoned myself again, saying, "They are too common to be anything else but the green *Tortrix viridana*;" but I sent larvæ to my friend Mr. C. G. Barrett. No reply coming from him, through some inadvertence or other, made me more sure that they were only *Viridana*; but again I thought, after throwing

them in my room, they must be knothorns. So off I went with a pillow-slip to fill with more, but when I got a lot in it I emptied my bag on the spot and left them, thinking after all they could only be some oddly-shaped *Viridana* spun leaves. Having had a seventy-mile trip, and thrown them all away, judge of my chagrin in two or three days after on seeing some fine *Rhodophaea consociella* and others crippled, sticking on the walls in my room. However, I got a fine series of three dozen all right. This is the first occurrence so far north that I know of.

At the same time I found over a hundred *Psychoides verhuel-
lella* out; I had brought a lot of hart's-tongue home with a great quantity of cases and larvæ on. This species seems to breed best by being kept very dry; in fact, the leaves were all as dry as tinder. Before this I always kept them too damp, and hence my bad luck in breeding quantities.

July came with fine hot weather, but I had an attack of rheumatism, which made me unable to walk much. However, with plenty of time and plenty of pain, I made another visit to Arnside, and met with *Sericoris cespitana* in plenty, and also with some *Sericoris conchana*; both of which were new to the district. I looked assiduously for *Emmelesia tæniata*, both at Arnside and Grange, but to no purpose. I then set off to Windermere, and spent ten days in that locality for *Tæniata*, but none put in an appearance until worn, as usual. The weather being hot and calm, and no rain at all,—a very unusual thing in the Lake District,—gave me better hopes that my rheumatism would leave, but not so; my left arm became quite useless, and I could only walk a few yards at a time. I took my son with me in a boat, and made for a little corner where I had seen some balsam (*Impatiens*) the previous autumn among some old dead sticks and nettles. The place was then perfectly dry; I got a stone to sit on, and took a candle to look on the plants for several nights, and was fortunate to take seven specimens of *Cidaria reticulata* just as they fluttered up at dusk; I did not get one after dark. We had the grandest of weather, but no moths—only three *Hypenodes costæstrigalis*, two or three “Snouts” (*Hypena proboscidalis*) and *Ypsipetes elutata*, and a few *Scopariæ*. Towards the end of the month *Tæniata* was stirring pretty freely, but no good ones; so I kept the females to lay eggs, which they did pretty freely. The young larvæ made their appearance in about three weeks

after, but what to feed them on was the rub. Having given a history before in your pages as far as I then knew, I can only add that the young larvæ seemed to take best, before hybernation, to a small flowering moss that grows by the side of wet rills. One changed in October, and another grew half an inch long; the others only about one-fourth of an inch, and since then they have not been seen. I expect them to creep up now shortly. As the larva is not known to any one, I purpose, if any more grow up, to get a correct drawing made for your magazine, for it will then be seen by the many, and not locked up from the world. My visits after this were chiefly larva-hunting, up to the end of October, among the *Hypericum*. In the wet woods *Neptica septembrella* was in nearly every leaf. Several journeys I made looking for fresh localities for the balsam; but last year, through some cause or other, the plant was a failure. It was suggested to me by a botanist that the weather was so cold in the autumn of 1877 that the seed never got ripe: be that as it may, I had over seven hundred miles of rambles in one fortnight to no purpose at all. I had got a few larvæ, but their number and species are soon gone through; and I suppose I have now the results to bear of my larva-hunting in the Lake District, where fog and rain in the autumn months prevail, by being confined to my house for the last ten weeks with rheumatism.

Beech House, Dutton, Ribchester, Lancashire,

April 12, 1879.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

NOTES ON THE GENUS ARGYNNIS.—In Edwards' 'Butterflies of North America,' three species of the genus *Argynnis* are figured, in which the male is of the ordinary fulvous and black colour of the genus, but the female approaches more nearly to the colour of *Argynnis Paphia*, variety *Valezina*. The species in question are *A. Diana*, *A. Nokomis*, and *A. Leto*. At the end of the author's description of the last-mentioned, he states: "The contrast between the sexes in this species is of the same nature as in *Diana* and *Nokomis*, and it is a very curious problem how the sexes in these species have come to differ so remarkably, when in nearly every other member of the extensive genus *Argynnis* they are essentially alike." As to the cause of Melanism I am not

able to offer any explanation, but in the case of *Argynnis Paphia* the ordinary form of female is of a decidedly greener hue than the male, so that the colour of the sexes does slightly differ, but in the variety *Valezina* the difference in colour from the male is quite as great as in the case of the three species before adverted to, and it is also well known that a male *Valezina* has never been captured. It is a very singular fact that *Valezina* is scarcely ever taken in any part of England but the New Forest, and I am informed that it rarely if ever occurs on the Continent. If, therefore, the New Forest were isolated from the rest of England, and any circumstances in the environment favoured in the struggle for existence the females having the dark green and black coloration of *Valezina*, I see no difficulty in believing that ultimately a species would be established in which the coloration of the males and females would differ as much as in those mentioned by Edwards. I have observed that the females of *Paphia* are very sluggish, and, on the contrary, the males are very active; it might be an advantage to the species that when the female rose on the wing, her colour being different from that of the male, she could be more readily detected, and would, therefore, have a better chance of being fertilized than females which were not so conspicuously coloured; I am quite certain that butterflies do discern colour. I once saw a specimen of *Pieris napi* stop in its flight and descend upon a piece of white crockery; and I have also seen a reddish brown leaf attract to the ground a male *Melitæa Euphrosyne*. The coloration in many British butterflies, particularly amongst the *Lycenidæ*, in which group the females are generally much duller in colour than the males, would lead to the belief that it is an advantage for the former sex to be of a more sombre colour than the latter. This would be the case were *A. Paphia* so differentiated that the females were always of the hue of *Valezina*.—J. JENNER WEIR.

LYCÆNA BÆTICA.—With reference to the notice in your number for March of the capture last year of *Lycæna Bætica*, it may interest your readers to know that while looking through some boxes of insects belonging to a friend of mine, I found, amongst a number of common English insects which he had purchased of a local collector on the Cotswold hills, a specimen of *L. Bætica*. My friend had long lost sight of this Cotswold

collector, but assured me that he was not a person who was at all likely to have purchased the insect, or obtained it otherwise than by capture. My friend supposed it be a hairstreak until I informed him as to its identity. It is now in the fine collection of Mr. A. F. Sheppard, of Lee, for whom I obtained it; and from my friend's account of it I entertain no doubt but that it is also a really British specimen of *L. Bætica*.—SAMUEL McCaul; Blackheath Club, Bennett Park, Blackheath, April 25, 1879.

INSECT HUNTING IN ABBOT'S WOOD.—The very interesting account of the New Forest that has lately appeared in the 'Entomologist' (Entom. xii. 75, 96, 120), under the title of "A Lepidopterist's Guide to Lyndhurst," cannot fail to have excited in the breasts of many youthful entomologists a longing to visit the beautiful spots so faithfully described by Mr. Bernard Lockyer. Two difficulties, however, generally stand in the way—time and expense. Many a young clerk, tied to his desk in the bank or the merchant's office, can only get a day's holiday at the most; and the question with him is where to go in the shortest time, at the smallest possible expense, with the greatest certainty of taking a large number of species. My object in writing these few lines is to answer this question. A journey to Brockenhurst or Lyndhurst averages three hours, at an expense of twenty-two shillings. The wood that I shall name can be reached in one hour and forty minutes, at an expense of nine shillings and eightpence. This wood, almost equal in beauty to the New Forest, is known as Abbot's Wood, and is within twenty-five minutes' walk of Polegate, a station on the London, Brighton, and South Coast Railway. One of the company's fastest trains (the "paper train") leaves London Bridge at 6.40 a.m., and slips carriages at Polegate at 8.20. A train returns from Polegate at 9.42 p.m., arriving at London at 12.5. My imaginary clerk may, therefore, spend the entire day at the scene of action, with time also for some sugaring. To find the best road to the wood, ask any of the officials at Polegate to point out two red-brick villas known as "Sunnyside;" follow the road in front of these, and you will come into the Hailsham Road (the privet-hedge on your right hand and the old blackthorn on the left will repay attention). In front of you, on the left, stands a pinky-white cottage with a black slate roof; go on past this cottage down the road, and take the first turning

on your left—a beautiful and productive lane, leading by a stile at the top on the right hand into a field. This is the “White Field,” one of the finest sugaring-grounds in the county. *Ophiodes lunaris* has been taken here, and *Catephia Alchymista* hard by. *Melitæa Athalia*, *Arge Galathea*, and the three large Fritillaries swarm in good seasons. *Apatura Iris* may be seen with certainty every year (about 18th July), in the left-hand corner nearest to the wood. I know one particular branch of a certain oak which, year after year, is a favourite throne of the “purple monarch.” At the top of the white field (whence you get a lovely view of the sea) is one of the numerous woods that go to make up Abbot’s Wood—these are Gnat Wood, Folkington Wood, and Cophall Wood. Folkington Wood has lately changed hands, and it is just possible that some difficulty may be experienced about going over certain portions of it. The owner of the “pinkish-white cottage” will, I am sure, give all necessary information on this head; and his son (a remarkably intelligent youth) knows the best spot where to look for *Apatura Iris*. The following is a list of the butterflies I have myself taken in the locality:—*Argynnis Paphia*, July 7th; common. *A. Aglaia*, June 28th; common. *A. Adippe*, July 2nd; common. *A. Lathonia*, September; once seen in the White Field. *A. Euphrosyne*, May 16th; swarms. *A. Selene*, June 4th; swarms. *Melitæa Athalia*, June 21st; common. *Vanessa Urticæ*, March, July, &c. *V. Polychloros*, March 20th, July 20th; common. *V. Io*, March 2nd, July 18th; common. *V. Atalanta*, May 17th, August 10th; common. *Pyrameis Cardui*, May to September; swarms in the wood, some years, in May. *Limenitis Sibylla*, July 19th; rare. *Apatura Iris*, July 18th to August 13th; plenty about the wood; use long pole; female flies low amongst sallow bushes. *Melanagria Galathea*, July 2nd; swarms in White Field, and common in wood. *Pyrarga Egeria*, April 13th, May and September; common. *P. Megæra*, May 15th, August 2nd. *Epinephele Janira*, June 10th. *Satyrus Semele*, July 15th; occasionally in the middle of the wood; swarms on downs. *S. Tithonus*, July 7th. *S. Hyperanthus*, June 29th; common. *Cænonympha Pamphilus*, May 12th, June 3rd. *Nemeobius Lucina*, June 1st, 1876; very rare. *Thecla Rubi*, April 28th, May 28th; common. *T. Quercus*, July 18th; swarms after 5 p.m. *Polyommatus Phleas*, May 27th to October; common. *Agestis Medon*, May 21st, and

August; common. *L. Icarus*, May to October. *L. Adonis*, June 15th, and August; not in the wood, but common on the downs in places. *L. Corydon*, June and July; occasionally in the wood, swarms all over the downs. *L. Alsus*, June 15th; same remarks. *L. Argiolus*, April 30th, July 24th; sparingly. *Colias Hyale*, August 12th; rare in wood, sometimes common on downs. *C. Edusa*, June 4th to November 14th; common all over the wood and downs. *C. Helice*, var., August 22nd, occurs in the wood. *Gonepteryx Rhamni*, February 17th, July 25th; very common. *Leucophasia Sinapis*, May 25th; of late years rare. *Anthocharis Cardamines*, May 4th till July 7th; common. *Pieris Daphidice*, August; one in lane leading to the White Field. *P. Napi*, *P. Rapæ*, *P. Brassicæ*; all plentiful. A small variety of *P. Napi* occurs in the wood. *Hesperia Malvæ*, May 1st to 25th; common. *H. Tages*, May 9th; common. *H. Sylvanus*, June 3rd; common. *H. Comma*, July 29th; rare in wood, common on downs. *H. Linea*, July 7th; common. At sugar nine-tenths of the Noctuæ may be captured, including many good things. As for the Geometers, many local species may be found; while of the smaller moths, *Agrotera nemoralis* abounds all over the wood about the end of May. I think I have said enough to prove that Abbot's Wood will furnish a mine of entomological wealth to a diligent and systematic collector.—W. C. DALE; 3, Copthall Court, E.C., May, 1879.

CRYMODES EXULIS AND HADENA ASSIMILIS.—I have been hoping that some one having a knowledge of the habits of these supposed species would have given the Rev. T. G. Smart and others the information asked for. Since this has not been done I may now answer what I had intended at first, as somewhat supplementary to Mr. Dobree's communication in the April number. It is almost universally admitted, I think, that the species are identical, and that Doubleday's *Hadena assimilis* is but a variety of the remarkably variable *Crymodes exulis*. Henry Doubleday, in the 'Addenda et Corrigenda' to his Synonymic List says: "After *Cespitis* insert *Crymodes exulis*, Lef.," and "Strike out *Hadena assimilis* as synonymous with *Crymodes exulis*" (p. 37). This opinion was never altered, for in his collection the two specimens are still labelled *Crymodes exulis*, but are placed between *Pachetra leucophæa* and *Cerigo*

Cytharea. Newman certainly figures and describes the two species, but without Mr. Doubleday's authority for their distinctness, since *C. exulis* is unnumbered and is sunk as a synonym in the 'Exchange and Label List,' published immediately after the completion of 'British Butterflies.' Dr. Staudinger, whose authority to decide should be unquestioned, if ever he saw any British examples, since he knew the true *C. exulis* so well in its home of Iceland, also gives *H. assimilis*, Dbld., as a synonym of *H. exulis*, Lef., in his 'Catalog,' and remarks of it, "Species incredibiliter aberrans." It is placed in his division B. b. of the genus *Hadena*, which is also made to include *Furva*, *Abjecta*, *Monoglypha*, Hufn. (= *Polyodon*, L.), *Lithoxylea*, *Sublustis*, *Sordida*, Bkh. (= *Anceps*, Hb.), *Basilinea*, &c. Mr. Nicholas Cooke and others, who know our British species, hold, I believe, to its distinctness from the Northern *Exulis*, but in so variable a species habits and life-history are most important; and if anyone can contribute further to the knowledge of our British species, it is his duty to entomological science to do so.—EDWARD A. FITCH; Maldon, Essex.

EUPITHECIA TOGATA.—During the last fortnight I have bred eight specimens of *Eupithecia togata*. These were from some pupæ which I received from Perthshire in the early part of last spring. During June, 1878, I reared fourteen specimens from forty-eight pupæ, while the remainder remained in the latter state until this year. There are still twenty-six pupæ, and I shall be interested to see if any of these pass through a third winter in the pupa state.—E. G. MEEK; 56, Brompton Road, S.W.

CARABUS AURATUS, *Linn.*, IN THE BOROUGH MARKET.—I this morning had given to me three very fine specimens (two males and one female) of the above beautiful insect. That they should be found running about the stones of a London market does at first seem somewhat remarkable, and it certainly is not a place where an entomologist would go in anticipation of finding such an insect, especially as it must be ranked among the rarest of our British *Carabi*, few instances having been recorded of its having been taken in England. I at first thought they might have found their way into this strange locality in the sacks of turnip-tops which come from the south coast at this time of the year; but upon second thoughts, I think it is more probable they have

been brought across the Channel packed in the pads of lettuce and salads which come from the South of France in large quantities in the months of April and May. This is a very common insect throughout France, where it is known by the name of *Le Jardinier*; but becomes rare as we advance northward, being seldom seen in Germany or Sweden.—T. R. BILLUPS; 4, Swiss Villas, Coplestone Road, Peckham.

Extract from *A Journey into Greece*. By GEORGE WHEELER; in company of Dr. Spon, of Lyons. In Six Books. London, 1682.*

“OUR first expedition was to climb up Mount Hymettus, whose foot is about three or four miles from Athens, south-east of it. This mountain is celebrated for the best honey in all Greece, of which it makes a great quantity to send to Constantinople, where it is much esteemed for making sorbets. They use, therefore, to bring all the honey made hereabouts, to be marked with the mark of the monastery of Cosbashi, to make it sell the better. We eat of it very freely, finding it to be very good, and were not at all incommodated with any gripings after it. This mountain was not less famous in times past for bees and admirable honey, the antients believing that bees were first bred here, and that all other bees were but colonies from this mountain; which if so, we assured ourselves, that it must be from this part of the mountain that the colonies were sent; both because the honey here made is the best, and that here they never destroy the bees. It is of a good consistence, of a fair golden colour, and the same quantity sweetens more water than the like quantity of any other doth; which they sufficiently experience in making sorbet. They wondered at my comrade, in that he preferred the white honey of France, telling him the white honey was raw, and not perfectly concocted, either by nature or the bees. Strabo, I remember, saith, the best honey of Hymettus was by the silver mines; but where they were, is now unknown, unless hereabouts, by the same reason. Now the best argument to prove that bees had their origin from hence, is, that here they never destroy or impair the stock of bees in taking away their honey, a thing which I no sooner knew, but I

* Contributed by the late Frederick Smith.—ED.

was inquisitive to understand their method in ordering the bees ; which being our art so worthy the knowledge of the curious, I shall not think it beside the purpose, to relate what I saw, and was informed to that effect, by such as had skill in this place.

“ The hives they keep their bees in, are made of willows, or osiers, fashioned like our common durt-baskets, wide at the top, and narrow at the bottom ; and plaister'd with clay, or loam, within and without. They are set the wide end upwards, the tops being covered with broad flat sticks, are also plaistered with clay on the top ; and to secure them from the weather, they cover them with a tuft of straw as we do. Along each of those sticks, the bees fasten their combs ; so that a comb may be taken out whole, without the least bruising, and with the greatest ease imaginable. To increase them in spring time, that is, in March or April, until the beginning of May, they divide them ; first separating the sticks, on which the combs and bees are fastened, from one another with a knife : so taking out the first combs and bees together, on each side, they put them into another basket, in the same order as they were taken out, until they have equally divided them. After this, when they are both again accommodated with sticks and plaister, they set the new basket in the place of the old one, and the old one in some new place. And all this they do in the middle of the day, at such time as the greatest part of the bees are abroad ; who, at their coming home, without much difficulty, by this means divide themselves equally. This dvice hinders them from swarming, and flying away. In August they take out their honey ; which they do in the day-time also, while they are abroad ; the bees being thereby, they say, disturbed least. At which time they take out the combs laden with honey, as before ; that is, beginning at each out-side, and so taking away, until they have left only such a quantity of combs in the middle, as they judge will be sufficient to maintain the bees in winter ; sweeping those bees, that are on the combs they take out, into the basket again, and again covering it with new sticks and plaister. This is done without smoak ; wherefore the antients call this honey—unsmoaken honey : and I believe the smoak of sulphur, which we use, takes away very much of the fragrancy of the wax ; and sure I am the honey can receive neither good taste, nor good smell from it.”

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[No. 194.

VARIETY OF *POLIA NIGROCINCTA*.



POLIA NIGROCINCTA (variety).

WE are indebted to Mr. Clarence E. Fry for permission to figure this beautiful variety. It is one of some forty specimens of *Polia nigrocincta*, bred by Mr. E. G. Meek from larvæ collected in 1877 by Mr. Pankhurst in the Isle of Man, while he was jointly employed by Mr. Fry and Mr. Meek to collect Lepidoptera in that island. The larvæ were fed up in the Isle of Man, but the pupæ were transferred to London. No particular variety was observed amongst the larvæ, which were fed upon sea-pink (*Armeria maritima*), and sea-plantain (*Plantago maritima*). The imagines of this species seldom vary either in colour or markings. Neither do the other British species in the genus *Polia*, with the exception of the north-eastern form of *Polia chi*, var. *olivacea*. The variety under notice is so unlike the original type as to be difficult to identify. The woodcut gives a general idea of the appearance.

Instead of the usual bright black and white of the superior wings, they are suffused with bright orange colour, with here and there a small patch of grey. The stigmata are strongly marked, the orbicular being filled in with bright sandy red. The usual black markings are very pale in colour; in fact dark grey. The anterior wings slightly suffused with black round the outer edge.

JOHN T. CARRINGTON.

LOCALITIES FOR BEGINNERS.

No. I.—WANSTEAD FLATS.

By JOHN T. CARRINGTON.

FROM time to time I am consulted by young entomologists where to go to collect insects, and especially where near London. It has frequently suggested itself to me that a series of short articles upon the localities most easily reached, and in a short time, will not only be of use to those who are now commencing the study of Entomology, but may possibly be the means of inducing others to join the army of fly-catchers. Although the whole of these may not become great entomologists in the proper sense, it cannot be doubted that it will do good in taking them from the hurry and bustle of our great city to the purer air of the fields, woods, and moors. If this series should be honoured in a perusal by the more advanced entomologist, he must remember that for him they are not written. Nevertheless, if in reading he is recalled to happy memories of *his* early collecting days, I shall have added another pleasure to my already pleasant labour. If errors from time to time creep in, I must apologise in anticipation, for my own daily occupation is such that I cannot now get so many opportunities for field work as I would wish. I shall have, therefore, to depend much on notes given by friends, and those who more intimately know the various localities.

One of the nearest localities to London is Wanstead Flats. This district is a portion of the once great forest of Epping. Though now no longer so extensive, enough remains of Epping Forest to enable the entomologist to get many a day's ramble each season. There are several ways of going to Wanstead Flats, but we need only describe two. One is by the way of Forest Gate Station on the Great Eastern Railway, to which trains leave Liverpool Street Station every half hour. On arriving at Forest Gate Station it is well to ask for the "Eagle and Child" inn, passing which the road will bring the traveller in less than half an hour to the "Flats." Another way is by train from Liverpool Street Station, as before, to Wood Street Station, Walthamstow; Wood Street is not more than six miles from London. Leaving the station turn to the left, when either road past the "Plow" inn (which is close to the station) will lead

to the "Flats." By this route the collecting ground may be reached in five or ten minutes. On arrival, Wanstead Flats will be found to consist of a mixture of pollard forest trees, under-wood, copse and swampy ground. Amongst the trees will be found oak, hornbeam, beech, a few maple, a little birch, and here and there a Scotch fir. On the Forest Gate side are avenues of lime trees; off these limes may be taken *Smerinthus tilice* and larvæ of *Xanthia citrigo*. In other parts of the country I have found the flowers of lime trees worth working after dusk for Noctuæ. Amongst the shrub-growth at Wanstead are whitethorn, blackthorn, bramble, broom, and the little whin (*Genista anglica*). In the early season these blackthorns should be searched for *Aleucis pictaria*. During the latter part of May and early June, by brushing amongst the broom, the imago of *Chesias obliquaria* will not unfrequently flit up. By sweeping or, better still, by searching amongst the *Genistæ* in May, will be found the very pretty larvæ of *Pseudopterpna cytisaria*, nearly full grown and through its hybernation. These latter larvæ may also be beaten from the broom. While looking on the *Genista anglica* will be seen the little white cases of *Coleophora genistæcolella*. Amongst the Micro-Lepidoptera may also be taken during the season, *Psyche radiella*, *Adela viridella*, and *Harpella Geoffrella*; the latter two in abundance. Among the rarer Tortrices have been found *Ephippiphora obscurana* from amongst oak-galls gathered during winter; likewise from the same galls came *Carpocapsa splendana* and *Heusimene fimbriana*. Besides these may be found a host of interesting Tortrices and Tineina.

On the Wood Street side of the "Flats" are a large number of holly trees; on these from May to August *Lycæna argiolus* is to be found abundantly. Wanstead also produces most of our commoner Diurni; some years ago *Melitæa artemis* used to occur there, but has latterly disappeared. The blackthorns should be searched for the larvæ of *Pieris crategi*, for at least one has been found there. *Vanessa polychloros* is not uncommon, as well as *V. Io*, *V. atalanta*, and *Pyrameis cardui*, the larva of which is abundant this year on the thistles. *Satyrus Ægeria* is not infrequent.

Those entomologists who wish to breed butterflies should bear in mind that for most species it is a waste of time to look for their larvæ during the day; but no sooner has darkness set

in than the sweeping-net will reveal scores, and many species, in May, June, and July. Unlike the imago state, the larvæ of nearly all our butterflies prefer for feeding time the darkness of night to the light of day. I remember how I used to look for the larvæ of *Erebia Blandina*; yes, for days when I was in Scotland, without finding one; but on the same ground, on trying one night with a lamp, I found them in hundreds, nearly every grass-stalk having its tenant.

On the *Epilobium* (willow herb) as well as on the bedstraw (*Galium*) will be found, in June and July, larvæ of *Chœrocampa elpenor* and perhaps *C. porcellus*. *Zeuzera æsculi* and *Cossus ligniperda* are both commonly to be found setting on and about the trees bored by their larvæ. At Wanstead these species are very destructive to the trees which they affect. It is no uncommon thing to see a tree bare of its leaves and a mere wreck of its former beauty, through the ravages of these wood-boring larvæ. *Nola cucullatella* may be found, in both larval and imago states, amongst the hawthorns in June and July. *Euchelia jacobæ* is, in some years, very abundant in the larval state on ragwort (*Senecio*).

At Wanstead the geometers are numerously represented, probably more so than any other group of Lepidoptera. Amongst the best are *Selenia illunaria*, *S. illustraria*, *Pericallia syringaria*, and *Ennomos tiliaria*, from the birch; *E. angularia* and *E. erosaria*, both amongst oak. *Himera pennaria* should be looked for in October and November, with *Hybernia aurantiaria* and *H. defoliaria* at the same time. *Timandra amataria* occurs in July, not commonly. The *Clematis* (travellers' joy) should be examined, from time to time, during the summer, when the many species which feed upon it may be found. Amongst these are—*Phibalapteryx vitalbata* and *Eupithecia coronata*. *Platypteryx hamula* and *Cilix spinula* are of frequent occurrence; the former feeds on oak and birch, the latter on blackthorn. The *Noctuæ* are well represented, especially the marsh species; one of the best is *Nonagria despecta*, a fine form. *Xylocampa lithoriza* and *Xylina rhizolitha*—the former in the spring, the latter in autumn—may be found at rest on trunks of trees. While looking for these, the beginner (who has proverbial luck) might find the rare *Xylina Zinckenii*, which has as yet only been found near London, and then at rest like its neighbours in the list. On the aspens on

the Forest Gate side may be found, in June, the larvæ of *Tæniocampa populeti*, between the united leaves. At light have been taken—*Heliophobus popularis*, *Charæas graminis*, *Luperina testacea*, *L. cespitis*, *Anchocelis lunosa*. Sugar produces a large number of the Noctuæ, *Noctua neglecta* not being uncommon in some years. In the early spring months many larvæ may be found at night with a lamp, especially by sweeping the low herbage; in spring also, on the birches, will be captured imagines of *Cymatophora flavicornis*. Amongst the Pyrales have been taken *Pyrallis fimbrialis* and *Endotricha flammealis* in abundance. On the duck-weed (*Lemna*) the larvæ of *Cataclysta lemnalis* feed in cases on the under side of the leaves under water. This is a very interesting larva to rear, for the aquatic larvæ of Lepidoptera in this country are not numerous. Amongst these are to be got in the ponds at Wanstead, *Paraponyx stratiotalis*, also *Hydrocampa nymphæalis* and *H. stagnalis*. The Crambites are not numerously represented in species, but those that occur are often in great abundance. These should be carefully examined, for frequently a rare species is overlooked amongst the crowd. On hawthorn sometimes may be found *Rhodophæa consociella*. The neighbourhood of bees' and wasps' nests should be examined for the honey-feeding moths, *Melia sociella* being the most frequent.

It will be seen that even so near London as to be within sound of its church bells, may be found a locality in which the entomologist may do much work; and this without let or leave, for Wanstead is open and free at all times, and the only trouble the collector is likely to get into is for actual damage to the trees and shrubs.

I think I have said enough in my first article to show that for even the hard-worked citizen there is a locality easily accessible, where he may pursue the science of Natural History, or of Botany, in comfort and without the worry of looking over his shoulder to see if "the keeper is coming." Before closing I have to thank Mr. Thomas Fedle for much information on the locality.

Royal Aquarium, London, S.W., June, 1879.

FURTHER REMARKS ON LYNDBURST.

By BERNARD LOCKYER.

UNLESS things have changed since my last exploration of the New Forest, I think visitors will not fail to be struck by the scarcity of lichen-feeding species, considering the great abundance of their food, which covers every bush and tree to such an extent that the oak woods seen from the higher ground in spring before the buds are out appear of a uniform whitish gray, almost as if frosted over, and which, on many of the bushes hangs in pendant masses of over six inches in length. The lichen-feeding Lepidoptera (the *Lithosiæ*, &c.) are said to be best taken as pupæ under moss on the bark of the forest trees. I was especially struck by the scarcity of *Lithosia complanula*, of which I only took one larva crawling up a trunk in Denny Wood, and two or three perfect insects (one at sugar in Park Ground); and by the entire absence of *L. mesomella* from the extensive heaths which form such a conspicuous feature in the scenery of the New Forest, the only localities where I took it, and which included one near the Clay Hill Heath entrance to Park Hill Inclosure just inside the gate, being limited and widely separated. As to *Cleora glabraria*, I have also seen it captured at rest in Park Hill Wood, and beat one or two full-fed larvæ out of oak in Pondhead in August, 1874.

With respect to butterflies I may mention that, as far as the Lyndhurst District is concerned, *Leucophasia sinapis* is of local occurrence, being confined to Park Hill Inclosure, Ramnor and Stubby Copse. It also frequents the "Manor Park," near Minstead.

Argynnis Paphia and *Limenitis Sibylla*, although generally distributed, are not abundant in every wood in the Forest; the first named being most prolific in Bignell Wood, Denny Wood, Park Ground and Pondhead, being the only *Argynnis* which breeds in the two latter, and the latter in the two last named inclosures only, especially so in Park Ground, where I have seen it attracted in some numbers by sugar.

I took a single specimen of *Arge Galathea* in Shave Green Inclosure in August, 1871. *Satyrus Algeria* usually

out-numbers *S. Megæra*, and *S. Hyperanthus* is a perfect pest. *Thecla betulæ* is very scarce, if I may judge from the fact that I only saw one larva and one imago; and *Polyommatus Phlæas* and *Lycæna Icarus* cannot be called common. *Hesperia linea* is of much more frequent occurrence than *H. sylvanus* (these two are both generally distributed, but *Syricthus alveolus* and *Thanaos Tages* are confined to Park Hill Inclosure and Stubby Copse, the latter insect being never abundant and usually scarce, the former lively little creature, generally common, occurring in little companies of three or four together.

As to the *Heterocera*, I may as well mention that *Notodonta dodonæa* and *Amphydasis prodromaria* are, like the majority of the oak-feeding species, generally distributed throughout the forest, and, together with *Cymatophora ridens* and other species, were beaten in some numbers (as larvæ) at Rhinefield, in June, 1875; where also was captured the larvæ of *Hoporina croceago*. *Saturnia carpini* is not common, and I only saw two females of *Selidosema plumaria* alive: both of these were captured on a heath west of Bignell Wood: I may note that I never saw this species settle on anything but heather; and that, although I devoted an evening to mothing for it on the race-course, I could not find a single specimen on the wing. I may, besides, call attention to a peculiar habit of the pretty little *Corycia taminata*, which frequently settles on the trunks of fir trees, where it forms a most conspicuous object at rest in the morning. It was common in Park Ground Inclosure, and I also saw it in Ramnor. *C. temerata* I never saw alive. *Tæniocampa rubricosa*, *Trachea piniperda*, and *Larentia multistrigaria* occur in the spring, but not usually in any numbers; and *Cymatophora diluta*, *Anchocelis rufina*, *Xanthia cerago*, and *X. silago* may be mentioned amongst the frequenters of sugar in the autumn; and, in conclusion, it may not be out of place to state that, of the two gaily-coloured *Euclidie* (both habitués of Park Hill and Stubby Copse), *E. glyphica* falls most often a victim to the net and pin.

FURTHER NOTES ON CERTAIN SILK-PRODUCING
BOMBYCES.

By ALFRED WAILLY.

As my notes on "Silk-producing Bombyces" (published in the 'Entomologist' for December, 1878, and January, 1879) were written very hastily through want of time, I beg of you to add the following remarks on the subject.

On page 264, fifth line, respecting the length of branches used for feeding the larvæ, the word *yards* should have been put instead of *feet*.

I now come to a most important point—the reproduction of the species in a state of confinement. From a perusal of my notes it will be seen that two species—*Attacus Pernyi* and *Samia Cynthia*—pair very readily; but with most other species pairing is the exception rather than the rule. Why should *Pernyi* and *Cynthia* pair very readily in any situation, and most other species only accidentally? In a state of nature certain species are reproduced to a far greater extent than others. When in a state of confinement the moths of exotic or even native species suffer from several causes—want of room, air, moisture, &c. With respect to native species, the cages containing the moths may be placed in the open air, and moisture may be supplied by watering the cages or placing wet sponges in them; but exotic species, if treated in the same manner, may have to suffer from another cause—the climatic difference between their native country and that of England, or any other northern country.

Hence the difficulty of obtaining fertile eggs, especially of exotic species, even supposing that male and female moths emerge simultaneously, which is not often the case unless a large number of pupæ be kept. In the middle of July I had at one time twelve fresh Atlas moths, male and female, three of which were of the giant race, yet I could not obtain a single pairing. Previously I had obtained a pairing with two of the smaller species of Atlas. With about fifty cocoons of *Pyri*, I only obtained three or four pairings.

Some persons think that if they have a few pupæ of one species they are certain to obtain fertile eggs. This is a great mistake, although the thing is not impossible. Now with

respect to the time and duration of the pairing of the species mentioned in my notes: *Promethea* moths I found to pair in the afternoon, or early in the evening; most other species very much later. The pairing of *Yama-Maï* and *Promethea* is very short; that of *Pernyi* and *Cynthia* is of very long duration; that of *Cecropia* is long also. The pairing of *Polyphemus* with some moths is very short; with others it lasts from about ten or eleven o'clock in the evening till next morning. The pairing of my Atlas moths lasted from about ten or eleven o'clock in the evening till seven o'clock P.M. of the following day. Of four pairings of *Actias Selene* two were of short duration, from about two o'clock in the morning till about five (three hours); the last two from the same time till about seven P.M. the following day. The average quantity of fertile eggs obtained from the four pairings was about the same from each female; the duration of the pairing having had no effect that I could detect upon the quality or quantity of fertile eggs; and it was the same with respect to the fertile eggs obtained from *Polyphemus*.

Another point of importance which I hope to be able to clear up this next summer—if I receive the Indian species I expect—is this:—Are the pupæ of Lepidoptera from tropical or circumtropical countries affected by frost, when sent to England or any other northern country during the winter months? Does an abnormal cold cause the death of the pupa, or delay the exit of the moth, till, sometimes, the summer of the following year?

From my note on Atlas in the January number, it will be seen that the cocoons received early in 1877, which had travelled during the winter, did not produce a single moth during the summer, 1877, and that some of the pupæ died.

From a letter (sent to one of our French Consuls in British India, which I received with one from the Consul himself on January 25th, 1879) I quote the following:—"The dispatch of live cocoons to Europe is rather delicate, and requires to be done about the month of April." As far as I can judge from experience, I believe the above statement to be perfectly correct; but I think, however, that if the cocoons could be protected from any severe frost during the voyage, they would receive very little or no check at all, and it would be preferable to receive them in winter if the cocoons are to be distributed.

This last winter (1878-9) the cocoons of North American

species could not be collected for me in such large numbers as during the previous winter; but I have a number of *Cecropia*, *Polypheumus*, and *Promethea*, sufficient to enable me to obtain a large number of fertile eggs. Of *Pernyi* I have a large number of splendid cocoons. Of other species, such as *Cynthia*, *Pyri*, *Spini*, I also have a sufficient number to obtain eggs. I have also a certain number of good European species.

Before I conclude, I must say a few words respecting two Indian species (from the Himalaya) mentioned by Mr. P. H. Gosse, F.R.S., in his able and interesting memoir on the *Attacus Atlas*. These two species are *Caligula Simla* and *Attacus Roylei*; the former lives on chesnut, the latter on all species of oak. I possess cocoons of these two species, but unfortunately I discovered a short time since that all the pupæ of *Cal. Simla* were dead, and only contained dry moths. *Cal. Simla* is a double-brooded species, and very likely the moths, being unable to emerge during the last autumn (1878), in consequence, perhaps, of the great difference of climate, died in the pupæ.

The cocoons of *Attacus Roylei*, of which I possess twenty-eight, seem all in good condition; and I hope that fertile eggs will be obtained from this species, if not by me, by others who have been fortunate enough to obtain cocoons.

110, Clapham Road, London, March, 1879.

Since writing the above I may state that I kept about forty pupæ of *Endromis versicolora*, with the object of obtaining fertile eggs. Only twenty moths emerged—seventeen males and three females. The first two females did not pair; the third female did pair for a considerable time, but died without laying a single egg. *E. versicolora* moths emerged from the beginning of March till the 5th of April.

Moths of *Attacus Roylei* all emerged from the 5th till the 20th of June; seven males made their appearance first. Subsequently I obtained seven fine females, which I placed with equally fine males in seven separate cages; but I regret to say I could not observe any of the couples *in coitu*. *A. Roylei* is a very wild species, resembling in shape and habits *B. Yama-Mai*. The eggs are similar, but somewhat larger than those of *B. Pernyi*.

From the fact of my having been unable to detect any pairing of *A. Roylei*, it does not follow that the eggs I have obtained will

be sterile, the pairing taking place sometimes very early in the morning, as is the case with *Actias Selene*, and lasting but a very short time. I may, therefore, yet hope that many of the eggs will be fertile.

Of *Caligula Simla* I have just received twenty-four eggs, but only three larvæ have as yet hatched: these refused to eat chesnut and oak, and have died. The other eggs, which seem in good condition, will very likely hatch; if so, I intend trying other food-plants.

The long and severe winter we have had seems to have affected the pupæ of the different species of Lepidoptera I have, and has delayed the emergence of the moths for several weeks. In all probability it has caused the death of many of the early spring species, such as *Endromis versicolora*, *Agria Tau*, *Attacus Spini*, and others.

June 21, 1879.

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of DR. S. C. SNELLEN VAN VOLLENHOVEN,

By J. W. MAY.

(Continued from p. 151.)

CIMBEX SYLVARUM, F.

Imago: *Fabricius, Entom. System.*, 105, 4. *Panzer, Fauna Germ.*, 88, f. 16. *Fabricius, Syst. Piezat.*, p. 16, No. 3, and p. 17, No. 7 (*Tristis*). *Hartig., Blatt und Holzwespen*, p. 64. *Brischke und Zaddach, Beobachtungen*, p. 48.

Larva: *Klug., Blattwespen-Gatt. Cimbex*, p. 88 (*C. Lucorum*). *Ratzeburg, Forstinsecten*, iii., p. 134, pl. 3, f. 10 (*Lutea*). *Brischke and Zaddach, Beob.*, pl. 2, f. 1 a and b.

Cimbex nigra, parce nigro-pilosa, abdomine aut violascenti-nigro, aut rubro flavoque cingulato, alis albis aut flavescentibus pellucidis, macula sub stigmate et margine exteriore fuscis.

I have referred on a previous occasion to the confusion existing in the nomenclature of the larger Cimbices, so that it will not be necessary to return to that subject now. We are indebted to Brischke and Zaddach for the light which has at

length been thrown upon this matter. In this confusion the present species has only been involved as regards that variety of the male insect which is entirely black, the red-banded form having already been recognised by Fabricius as a distinct species.

I have already given a figure of the larva of *Sylvarum* (vol. v., 2nd series, page 70, pl. 4, fig. 3), only, however, for the purpose of calling attention to the points of difference between it and the larva of *Lucorum*, and without any reference to its metamorphosis. I have since received another larva from Dr. A. J. van Rossum, from which I am enabled to give a description of its metamorphosis after having had to wait a long time for the appearance of the imago. My description is, however, still imperfect, the egg and even the pupa being wanting. The first is, in all probability, deposited in a wound made by the saw of the female in the bark of a twig or petiole of the birch, and is, probably, either colourless or of a pale green tint.

I am also unacquainted with the earliest stages of the larva. Zaddach, however, informs us that its whole body is covered with a white powder, excepting in the middle of the dorsum at the place where, later, the beautiful blue dorsal line makes its appearance, the first trace of which is a little fine black line, visible after the second moult. The first of the two larvæ which I have had in my possession (it may be taken as a proof of the rarity of the species in the Netherlands that I have only been able to obtain two) was found on a birch tree near Noordwijk in the beginning of October, 1858, and from this was reared the dark-coloured male which I have figured. This larva is represented on the plate already referred to in the fifth volume, and on the present plate 3, fig. 5.

The other larva was sent to me from Enschede by Mr. van Rossum; it was among some other *Cimbex* larvæ which I thought at the time must be referred to *Cimb. sorbi*, Zadd., in which, as it afterwards appeared, I was mistaken. Mr. van Rossum had mentioned to me in his letter that he sent two species, so that he had clearly distinguished the larva of *Sylvarum*. The larva received from Enschede (figs. 1 and 2) was greener and less yellow than that found at Noordwijk. Both had the usual form of the larger larvæ of this genus, resting during the day-time rolled up on the under side of a leaf, and

feeding in the evening, and probably also during the night. They feed on birch leaves, and one of them on being touched ejected a fluid from some little glands on the side of the body above the spiracles. The larvæ have a smooth round head, almost entirely white; the eyes are black, and the jaws brown at the top; the body is thick and round, but in appearance somewhat angular in consequence of the colouring on the back; the general tint is yellowish green, the yellow being more predominant about the neck, on the ventral surface, and on the last segment. The full-grown larvæ have a blue line running along the dorsum; this line is very fine at either extremity, and begins at the second segment of the body, and ends before the last, thus not extending from the head to the anus, as in *Cimbex connata* and *lutea*. On either side of this blue line the colour of the skin is yellow, either sharply defined, as in fig. 2, or gradually shading off, as in fig. 5. Each segment has seven dermal folds (see fig. 3), four of which bear small spines or prickles, very irregularly distributed. The spiracles have more or less the form of the sole of a stag's hoof, and are of a black tint (see fig. 4). The legs, which are twenty-two in number, are all white, the six thoracic legs being armed with brown claws.

I had not fed my larvæ long before they spun up, forming a very strong cocoon, almost oval in form, and consisting more of threads of a gummy secretion than of silk. The cocoon of the greener larva was pale brown, that of the other shining yellow; this latter is shown at fig. 6. In the case of the larva taken at Noordwijk, the change into the perfect insect took place within ten months; the other, however, took a longer time, and remained over the summer, appearing on the 15th of May, 1874. This circumstance, coupled with the rarity of the larva in this country, was the reason of my not opening the cocoon in order to observe the pupa, as I feared that by doing so I might interfere with the progress of the metamorphosis.

I obtained both sexes from the larva; from fig. 5 I reared fig. 7, and from figs. 1 and 2 I obtained fig. 8. Fig. 9 is drawn from an individual captured on the wing. The present species is a little smaller than the nearly-allied *Cimbex connata* and *lutea*, and is distinguished by having the back of the thorax less pubescent, and by the colour of the abdomen; moreover, the

wings have a brown stain below the stigma towards the base, and a brown or black border along the apical and posterior margins. The following is a description of the three examples figured:—

Figure 7; a male. Head, thorax, and legs, as far as the tarsi, purplish black, rather strongly punctured, and covered with erect silky black hairs. Jaws black, and palpi white. Antennæ clavate, six-jointed; the first two joints black, the third also black, but having the apex red-yellow; the remaining joints red-yellow. The tarsi are sordid yellow, having the first joint and the tip of the last, as also the claws, brownish. The scutellum is very short and broad; the cenchri brownish white. The first segment of the abdomen is deeply emarginate, the emargination being of a semicircular form, and consequently the space behind it, where the chitine is wanting, is large. The dorsal surface of the abdomen is purplish black, with a red-brown reflection on the third and fourth segments; the under-side is red, except the anal plate, which is purplish black. The upper side of the seventh segment is deeply indented in the middle. The upper wings have a purplish blue reflection in the marginal cell, which is also observable at the base of the under wings.

Fig. 8. A female, smaller and weaker. Head purplish black, with bronze cheeks. Thorax of the same black tint, the prothorax, however, bordered with sordid yellow. The first two joints of the antennæ brown, all the remainder reddish yellow. The coxæ and apophyses purplish black; the femora are of the same colour, having, however, the knees pale brown; the tibiæ and tarsi yellowish. The two anterior segments of the abdomen, the base of the third in the middle of the dorsal surface, and the eighth segment are purplish black; the remaining segments are greenish yellow, both above and underneath, having black markings between. The broad valves of the saw and the ovipositor are shining brown, and covered with short hairs. The wings are the same as in the preceding.

Fig. 9. A male taken by Mr. Ritsema in July near the water-works in the downs between Vogelenzang and Berkenrode. It was much worn, and had lost almost all its hair and the dark borders of the wings. Head and thorax purplish black; four little lines on the vertex and the posterior border of the prothorax

red. The third joint of the antennæ red, with black base (fig. 10). Abdomen, segments 3 to 6 red. The legs had all the tibiæ purplish red-brown, and the tarsi yellowish brown-red. Further, the same as fig. 7.

I have already mentioned, in my 'New Catalogue of Indigenous Hymenoptera,' that entirely black females of *Cimbex sylvarum* occur in the Netherlands, and Mr. A. A. van Bemmelen obtained such an example from a cocoon found at Driebergen. In addition to these differences in coloration Zaddach mentions two others, both in female examples. In one the abdomen, which was black, had some of its segments ornamented with two yellow spots (*C. decemmaculata*, Leach); in the other the whole insect was brownish yellow, with the exception of the dorsum of the thorax, a spot on the pectus, and the base of the abdomen. As far as I have been able to learn these varieties have not been found to occur in the Netherlands.

In conclusion I must here add from my note-book the description of a larva received on the 18th of September, 1862, from Mr. de Roo van Westmaas. It was found at Velp, in a lane of elm and beech trees, and was full grown, so that it had already begun to spin up when I received it. The size was the same as that of *C. lutea* from the willow. Head pale yellow, trophi greenish, under-lip brown. Eyes small, black, with very small shining black rings round them. Body yellowish green, yellow at the sides on the last two segments; a narrow blue dorsal line, not beginning at the head, and only proceeding as far as the eleventh segment. The sides of the body and the posterior segments closely set with white spines; spiracles oval, shining black; the excretory openings above them purple. All the legs yellowish green; claws brown. This larva did not undergo its metamorphosis. To what species can it have belonged? The description agrees very well with our species *Sylvarum*, excepting the words "spiracles oval." In addition to this the statement that it was found in an avenue formed entirely by elms and beeches does not seem to point to a species feeding exclusively on birch.

ECONOMIC ENTOMOLOGY.

By STEPHEN FITZWILLIAM.

IN the course of a conversation I recently had with the editor of the 'Entomologist,' the subject of neglected work was referred to, and I alluded to the way in which much of the practical work of the late Andrew Murray seemed to be now neglected. At the wish of the editor I write the drift of my remarks. I am not an entomologist, but I have had occasion several times to write on the practical aspects of Mr. Murray's work, and from the time of my first knowing him I gave him such help as my pen could give to forward his efforts to arrange some organisation (Government or otherwise) for checking insect damage to crops. I know how deep was his earnestness both in this endeavour and in forming the educational collection now at Bethnal Green Museum. I had frequent opportunities of discussing with him the American and continental organisations for arresting insect damage, and what should be done in this country. I was with him at the "*Exposition des insectes utiles et des insectes nuisibles*" in Paris in 1876, where we made full enquiries into the history of legislation in France on the subject, and I aided him subsequently in arranging the conference held at the rooms of the Society of Arts. In fact, nearly all I know on the subject of insect damage I have known from him, or from looking up records and histories in connection with him. What I have written on the subject has been on legislation with regard to it, or on the educational aspects of the question, such as the spread of a knowledge of how to recognise insect friends from insect foes, and how to deal with the latter.

In now again writing on Mr. Murray's work I still take it in its practical bearings, admitting that England perhaps possesses other men who could have done it as well; but on this point I am not qualified to judge, for, as I have said, I am not an entomologist, though I am sure none could have worked more enthusiastically. I look at the matter in this light. Here was a portion of a life's work patiently and laboriously given to carrying out an object. The collection now at Bethnal Green is a memorial of much of that work; but the point to which I especially ask attention is, what is the result of the energy which was expended in trying to

lead to practical action that should be for the good of our agriculturists and horticulturists? It is all very well to say his work remains there at the Bethnal Green Museum. That is but a part of his work,—a means to an end,—a basis perhaps for action. Visitors to the Bethnal Green Museum are not those who have the practical control of our agricultural operations. Most visitors there take an equal interest in a collection of art furniture, bulldog china, wrought-iron work, or pictures. Any addition to their knowledge is interesting, but they cannot all take action on that knowledge, and the number who would be led to take any practical steps from seeing the collection of "Economic Entomology" must be very small.

As matters stand at present the chief practical use of that collection is as a typical collection, parts of which might be reproduced in museums or schools in agricultural districts. All his efforts to secure something being actually done seem to me to have been wasted unless some one continues what he began.

In September, 1876, Mr. Murray took definite steps by memorialising the Lord President of the Council, pointing out what was done in other countries to extirpate insect foes, and suggesting that an experiment should be made to do something in England. He thought that compulsory legislation is probably premature, and at any rate could be more effectively demanded if the permissive action had been tried and failed. A central directing authority, he urged, is absolutely essential; if the experiment is to be tried let us use our best means.

He suggested that in 1877 the attempt should be made in two or three counties to begin with. Cheshire, Lancashire, and Derbyshire had suffered greatly for some years past from the onion and carrot flies. He wrote, "Let the diminution or extirpation of these flies in these counties be the first experiment. A trial to that extent would neither be troublesome nor costly, and it would to a certain extent serve as a test and guide for further proceedings. All that would be necessary would be the circulation in these counties—through the clergymen, schoolmasters, municipal authorities, and local papers—of an appeal urging every one to pull up and burn his infected plants (which are easily distinguished) on a particular day about a certain date, and to get the parochial authorities to take some trouble to see that this is done. . . . Two or three years' perseverance

in such a course should gradually diminish the numbers of the insects."

This subject was discussed at a Conference held at the Society of Arts' rooms, under the presidency of the Duke of Buccleuch. It was made known that the answer to Mr. Murray's memorial to the Lord President was that he did not see that it fell within the province of this Department to take action in the matter, and there the subject seems to have rested.

Now the practical point I would take this opportunity of bringing under the notice of entomologists is this:—Are Andrew Murray's efforts to go for nothing, or will some society keep the question to the front till something is actually done? Nothing at present is being done in the way of State action, so far as I can learn, and I have taken some trouble to get myself properly informed. Certain it is that the Science and Art Department, under whose direction he arranged the collection at Bethnal Green, is doing nothing to carry on his work, nor has anything been done by the department to take any action in the way of arranging concerted action to deal with insect damage in some such way as Mr. Murray suggested.

Perhaps it is all right that matters should be as they are; possibly insect damage in England may be overrated. It is extremely difficult to know what is the annual amount of damage done. Though the subject has received attention for nearly one hundred years, and though the amount of interest taken by all classes in our agricultural progress is great, and though we have central and local agricultural societies in abundance, we are still without organization of any kind for obtaining statistics as to losses from this cause. However, I find frequent references such as this, which I quote from the 'Gardener's Chronicle' of 1875, p. 780:—

"The subject of insect damage is certainly occupying more of the public mind in this country now than it has perhaps ever done before. We cannot open a horticultural or agricultural periodical without stumbling upon some allusion to it, and there is scarcely a meeting of the Royal Horticultural Society's Scientific Committee at which a large portion of its time is not taken up in answering inquiries and discussing questions relating to it that have been submitted from without."

The 'Times' of September 16th, 1876, wrote thus on the subject:—

“ Our knowledge—that is, the knowledge of our men of science—is in a sufficiently advanced state to know what to do to check insect ravages. The life-history of nearly all crop pests has been worked out. The time of egg-laying, the places selected for their deposition, the habits of the larva, the condition of the chrysalis, when there is one, the life of the fully-developed insect, are all known. The most effective way of destroying the insects, selecting either the egg, larva, or chrysalis state, is also known; and much of this has been known for years. It is to be hoped that this collection will direct attention to this question—‘ How is it that with so much knowledge we annually suffer such great losses ? ’ The question has been asked in America, where in many States there is a State Entomologist; and the answer has taken this form—‘ The individual application of the knowledge is of no good; it is useless for one property to be cleared of pests while surrounding properties still breed them. Combination is needed, and the interference of Congress can alone secure this.’ Dr. Leconte, in his address before the American Association for the Advancement of Science, at the Detroit meeting, suggested that the importance of combination should be urged upon farmers, and that information as to probable benefits should be supplied to them. Bills have been introduced into Congress on the subject, but the Report for 1867 of Mr. Riley, which has just reached England, does not show more than that earnest attention is being given to the question. That Mr. Murray’s hopes do not end with the arrangement of his collection as a means of usefulness is foreshadowed by a paper on insect damage he read before the Royal Horticultural Society a year ago. He wishes to see some united active steps taken for clearing whole districts at once of pests. If united action could by any means be secured, the work would be simple. A scientific inspection of a district would decide with regard to a particular pest the condition of development in which it would be on certain days. Instruction would be given as to the course to be adopted, and if this were simultaneously acted on throughout a district, the pest might be checked, if not entirely removed. It is sincerely to be hoped that either some society or the Department will take so important a matter up.”

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

THE WEATHER AND ITS EFFECTS ON LEPIDOPTERA.—On 1st June I captured a fine imago of *Cucullia chamomilla* within a few yards of my house at Blackheath. The usual time of the appearance of this species in the perfect state is during the month of April and the earlier part of May, so that the specimen in question had emerged from the pupa about one month

after the usual period. I give the above as an illustration of the late appearance of Lepidoptera this year, and I think it would be very instructive if similar communications were made to the 'Entomologist,' in order that the effect on insect life of the extraordinary meteorological conditions through which we have been and still are passing may be recorded. In this neighbourhood the oak was not in leaf until beyond the middle of May, and the ash was not out till the end of that month. I saw no hawthorn in bloom until May was past. The continued bad weather has prevented most of the London entomologists from making excursions, but no doubt valuable observations have been made by those residing in the country. It is such observations that it appears to me it is so very important to record for permanent reference, and I trust that our subscribers will kindly respond to my request.—J. JENNER WEIR; 6, Haddo Villas, Blackheath, S.E., June 21, 1879.

PYRAMEIS CARDUI.—Although insects, especially Lepidoptera, are so very scarce this year, *P. cardui* is in abundance after hybernation. It has been seen in the streets of London, also in the suburbs, especially Camberwell, Hackney, Bethnal Green, and at Chingford and Sidcup, and many other places.—T. EEDLE.

A CLOUD OF BUTTERFLIES.—A strange occurrence is reported from Wetzikon, Canton Zurich. On June 14th the commune was invaded by an immense swarm of butterflies, a kilometre wide, and so long that the procession took two hours to pass. They were principally of the kind known in Switzerland as *Distelfalter*, which feed on nettles and thistles. They flew from two to ten metres above the ground, and went off in a north-westerly direction. *Distelfalter* is the common German name for *Cynthia cardui*.—J. W. SLATER.

ABUNDANCE OF INSECTS.—The 'Patriot' of Angers relates that on June 10th an immense number of butterflies were observed flying above a part of the city called Le Mail. They were travelling at a little distance from the earth, and inconveniencing persons walking in the streets. The same phenomenon was observed in Alsace, at Bisheim, on the 8th. The Bisheim butterflies were so numerous, according to the 'Journal d'Alsace,' that the light of day was obscured. Their colour was red, in places tinged with grey. Swarms of grasshoppers have recently appeared in Armenia. News from Elisabetpol states that both

the banks of the River Kur were completely covered with the insects, as far as Tarter on the one bank, and as far as Akstafa on the other. All vegetation is devastated.—‘NATURE’; June 19, 1879.

COLIAS EDUSA.—On Saturday last I saw a specimen of *Colias Edusa* flying, but could not distinguish its sex. Perhaps this may be a harbinger of another “*Edusa* year.”—HOWARD VAUGHAN; June 19, 1879.

COLIAS EDUSA IN JUNE.—I am pleased to have to record the occurrence of *Colias Edusa* in June. (1) Two specimens of *C. Edusa* flew by me on Monday, June 9th, while riding on an omnibus near the Marble Arch about 1.50 p.m., flying south-west. (2) I saw two specimens on June 17th; one in the Avenue, Brondesbury, about 12.30, and the other in Cavendish Road, about 1.30. The weather was fine, and the sun very warm; flying south-west each time; S.W. wind. (3) I observed a specimen flying on the embankment of the North London Railway opposite here, about ten minutes past one on Friday, June 20th.—R. T. GIBBONS; Cecilyte, Cavendish Rd., Brondesbury, Kilburn, N.W.

ANTHOCHARIS CARDAMINES (var.)—On June 6, 1879, was captured, by a friend of mine, a male *A. cardamines* with the orange only on the right wing; the left wing white with the black spot, and dark on the edge. This is, I believe, of unusual occurrence.—WILLIAM DEAN; Epping.

BUTTERFLY LARVÆ.—I have latterly been collecting some butterfly larvæ for the purpose of preservation. I have found little difficulty in obtaining several of the commoner species, and have now feeding in my cages the following:—*Satyrus Janira*, *Chortobius Pamphilus*, *Lycæna Alexis*, *L. Corydon*, and *L. Adonis*.—T. EEDLE; 40, Goldsmith Row, Hackney Road, E.

ACRONYCTA ALNI NEAR NOTTINGHAM.—The larvæ of the rare *Acronycta alni* which Mr. Watchorn, of 30, Mount Street, found at Cotgrave on August last, came out on Tuesday, June 3rd, a perfect imago, and was exhibited at this society’s room on Monday, June 9.—J. BROOKES, Hon. Sec.; Nottingham Working Mens’ Naturalist Society.

LAPHYGMA EXIGUA IN THE ISLE OF PORTLAND.—On the 6th of June, 1879, I obtained two examples (as fine as bred) of this rare moth, near the Chesil Beach, at Portland. This is its first recorded occurrence, I believe, in the county of Dorset.—O. P. CAMBRIDGE; Bloxworth, Dorset, June 18, 1879.

LAPHYGMA EXIGUA.—Last evening two young gentlemen of this town, who are making a collection of Lepidoptera, brought me a few of their recent captures to name for them, and among these was a very fair specimen of *Laphygma exigua* (female), taken at light on the evening of the 17th instant. They also informed me that they have another on their setting-board at home, taken on the 18th. I think this is worthy of record in the 'Entomologist,' as *L. exigua* is undoubtedly one of the rarest of our Noctuæ. At all events I can vouch for its rare occurrence here; having carefully worked this locality for the last fifteen years, I have never seen a single specimen.—W. McRAE; Westbourne House, Bournemouth, June 28, 1879.

LAPHYGMA EXIGUA, DEILEPHILA LINEATA, &C., AT TORQUAY.—On the 11th inst., at Torquay, I captured, at dusk, a fine *Deilephila lineata*, male, at the flowers of *Silene maritima*, and on the following evening I took, on the wing, a *Laphygma exigua*, female. On the 20th inst. I secured, in a clover-field, flying in the bright sunshine, a fine *Heliothis armigera*, female.—A. H. JONES; Eltham, Kent, June 20, 1879.

OCCURRENCE OF EPHIPPIPHORA RAVULANA.—While collecting in Tilgate Forest, on the 12th June, I captured a single female specimen of this rarity when on the wing. Curiously enough my capture was made within a yard or two of the spot where I took a former specimen, also a female, a few seasons ago.—WALTER P. WESTON; 1, Duncan Terrace.

NOTES ON THE SEASON.—At the time I write from this moorland district it is still bitterly cold. *Hybernina progemmaria* and *Diurnea fagella* are still out. I took the same species in the first week in April. During the first week in May I took over fifty *Peronea mixtana* by smoking them out, and at the same time a green hairstreak (*Thecla rubi*) flitted out. A solitary *Fidonia atomaria* ventured forth. When coming here on Friday evening I saw a moth quite new to me; it was about six o'clock and bitterly cold. Its flight was much like that of the emperor moth, but the colour was of a lilac-brown. The man who was with me said he had been after one for some weeks, and my wife had noticed either the same insect or one similar. I have wondered whether they could be *Lasiocampa ilicifolia*. When looking for larvæ of *Gelechia tricolorella* on the stitchwort (*Stellaria holostea*), I found a large

larva of a *Plusia*, which I hope to be *P. bractea*. I used to take it frequently here some thirty years ago; it was feeding upon dog mercury. I have taken a description and made a sketch of it, and afterwards found two other tenements that had been deserted on the same plant by a *Plusia* larva.—J. B. HODGKINSON, Dutton, Ribchester, Lancashire, May 26, 1879.

OCCURRENCE OF THE LARVA OF NEMOTOIS SCHIFFERMILLERIELLA.—I have much pleasure in being able to record the capture, on April 24th, of the larva of *Nemotois Schiffermilleriella* in the vicinity of Gravesend—a larva, I believe, hitherto not observed in Britain, although the imagos are taken in one or two localities every year. For the last two seasons I have looked in vain for the larva in a locality where for some years past I have taken the perfect insect, but this year, I am happy to say, I found about twenty-seven cases. Since I have had the larvæ feeding I can now quite understand the reason of my failing to discover the larva before. I had always searched the upper leaves of its food-plant (*Ballota nigra*), thinking they were attached to them, but I find on observing those I have in the glass jar that when the food is touched, be it ever so slightly, they draw themselves into their cases and drop to the ground, so that the surface of the ground round the food-plant is the place to look for them. It was by the merest accident I found the first case; I had been searching as usual the upper leaves of the plant for about two hours, but could not find any case, when I suddenly thought I had better examine the radical leaves, thinking they were on them. Almost the first leaf I turned over I saw a case on the ground. I then set to work with a will, but as it was getting dark I could only find six cases. On a subsequent visit I found twenty-one more with larvæ in them, and several empty ones, no doubt last year's cases. The cases are flat, of an oblong oval form, open at each end, and drawn in at the centre, very much like the figure of eight, and with the single exception of my cases and larvæ being larger (quite six or seven lines in length) they agree in every particular with the very excellent description in the 'Natural History of the Tineina,' vol. xiii, p. 214. Of some cases I sent to Mr. Stainton, he writes that although he had never seen British larvæ before, and they are certainly larger than those he received from Frankfort eighteen years ago, he has no doubt they will

prove the same species, both from the food-plant and from my having taken the insect in the same locality. I have also observed in the larvæ that if they are touched when crawling they immediately draw themselves into their cases, and after a time appear at the other end and crawl away in an opposite direction. The cases appear to be constructed in two pieces or *halves*, as it were, merely fastened together in the centre where constricted, and which acts like a hinge, so that when the larva protrudes itself from one end it causes the other end of the case to become securely closed—a very wise provision against all marauding intruders.—GEO. ELISHA; 122, Shepherdess Walk, City Road, N.

COLLECTION OF ECONOMIC ENTOMOLOGY.—A valuable “Collection illustrating the Injuries to Garden and Field Crops, Pasture Lands, Timber Trees, and Grains, resulting from the attacks of destructive British Insects, exhibited by W. S. M. D’Urban and the Misses E. A. and G. Ormerod,” was recently exhibited at the Exeter meeting of the Bath and West of England Agricultural Society. This has been established through the labours of Mr. W. S. M. D’Urban and the Misses E. A. and G. Ormerod. It is somewhat after the type of the instructive but incomplete collection in the Bethnal Green Museum; the arrangement, however, is different, for here the more natural grouping of the insects injurious to certain allied plants, crops, or productions is followed, entomological classification being altogether ignored. The collection is intended to be thoroughly practical in its teaching, and is well illustrated with specimens of insect ravages, or, where these are difficult of preservation, by beautiful models or illustrative vignettes. Although only commenced last autumn it is already well spoken of, but help is asked for its future development; this, doubtless, will be forthcoming, and when located in its permanent resting-place of the Devon and Exeter Albert Memorial Museum it will form a fitting type of what ought to be in every local museum in the kingdom. Bethnal Green is dormant, possibly Exeter will outrun it.—E. A. F.

ENTOMOLOGICAL PINS.—We have received a sample-card of the entomological pins, gilt and plain, made by Messrs. D. and F. Tayler and Co., of Birmingham. We have pleasure in bringing them under the notice of our readers, although the well-known excellence of these pins is a sufficient recommendation.—ED.

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VARIETIES OF *LYCÆNA AGESTIS*.



Fig. 1.



Fig. 2.

THE extraordinary variety, figured above as No. 1, is from my collection, and was captured by me last season. The ground colour of the under side of all four wings is of a pearly white colour, while the row of red spots along the margins of the wings is very bright and distinct. Except the central spot on each front wing, and two others near the upper margin of the lower wings, the normal black spots are entirely absent.

The other striking variety, No. 2, while approaching the preceding in the silvery ground colour of the under side of the wings, affords a beautiful contrast in markings. The black spots on the fore wings are prolonged into streaks, of which the first upper ones are more decided, the lower ones having a smoky appearance. There are two very clear streaks on the upper margin of the lower wings, which are also sprinkled with small irregular spots. This specimen was taken by Mr. William B. Farr, of Maidenhead, last season, in Surrey, and kindly presented by him to Mr. Carrington.

WALTER P. WESTON.

THE TORTRICES OF SURREY, KENT, AND SUSSEX.

By WALTER P. WESTON.

THE south-eastern corner of England, either from its proximity to the metropolis or on account of its being easier of access than more distant localities, is, I think, more extensively worked by entomologists than any other district of equal extent; and though the lists of rarities and of species occurring in these counties are very long, still much more remains to be done before we can claim to have exhausted their entomological fauna. There are extensive districts that have never been worked, except in the most casual way, which would well repay the collector who was bold enough to search out a fresh locality for himself instead of visiting the same places and taking the same insects season after season. But to do this completely would require a long sojourn, or at least constant visits, as it is only by continual working for several years that one is able to form anything approaching a tolerably complete idea of the different species occurring in any locality.

Amongst the entomologists who devote their attention to these counties a very large proportion are exclusively Macrolepidopterists, who, from want of time or inclination, pass over the groups of smaller insects entirely without notice. I have frequently been informed by beginners and others that this is due in a great measure to the difficulties of setting and nomenclature, though perhaps the latter would apply more to the group under our present notice, as there is no complete work on the Tortrices that can in any way compare with Mr. Stainton's careful treatise on the Tineina. For although Mr. Wilkinson's work and Mr. C. G. Barrett's "Notes on the Tortrices" are of the greatest use to the student, yet the former is sadly in need of a supplement to carry its information down to the present time; and the latter, from the broken form in which they have appeared, are not so easily available as to be of much assistance to the beginner.

In the hope of inducing some of my readers to devote more attention to this most interesting and by no means difficult group, I have endeavoured to make out a list of the species occurring in these counties, which are exceedingly rich, a very large proportion of our total number of species occurring in them.

Besides the district lists from Folkestone, Hastings, and Reigate, I have been obliged to depend entirely upon the kindness of friends and my own notes for the information contained in the following list. I have made it as complete as possible; still it presents a somewhat meagre appearance, especially in the number of localities in which the various species of insects are known to occur.

In making a collection of Tortrices—and it will be extremely difficult, if not impossible, for anyone to become thoroughly acquainted with this group of insects without a collection at hand for constant reference—the chief difficulties to be encountered are the tendency of some of the species to “spring” after being set, and of others to succumb to the gradual production of verdigris. To avoid the former evil the Tortrix collector must, with the majority of specimens, entirely dispense with the damping box, which almost invariably causes the wings of the specimens left in it to close over the back, like those of a butterfly at rest. When they have once assumed that position it is scarcely possible to set them with any certainty of their permanently retaining the desired form. During the first spell of damp weather their wings frequently show a tendency for the upward movement just described, until in a short time the cabinet series exhibits a complete variety of attitudes by no means pleasing to the eye, and as opposed as possible to all ideas of symmetry. With very few exceptions, such as *Phtheocroa rugosana* and some of the *Eupæciliæ*, Tortrices may safely be carried home in pill-boxes, unless the size chosen is too small, without danger of their damaging themselves; but it is never advisable to put more than one specimen into each box. The smaller sizes of the glass-bottomed boxes are most handy, for they enable a closer view to be taken of an insect than is possible in the net, and also facilitate the rejection of worn and damaged examples, two advantages which are not to be despised at any time, and are especially useful on fortunate expeditions. I need hardly remind my readers that, when captured, all Micro-Lepidoptera should be kept in the dark and as cool as possible until they are killed.

Some groups of Tortrices are more subject than others to the attacks of verdigris, to which those whose larvæ are feeders upon pith of plants are particularly liable. I may specially mention as instances of this the *Dicroramphæ* and several of the *Ephippiphoræ*

and *Eupaciliae*. Mr. Meek has introduced enamelled pins impervious to verdigris, but they have hardly been in use long enough for their true value to be estimated.

There are several methods of killing Tortrices, some of which are preferable to others, for they do not stiffen the specimens after death: of these liquid ammonia is most to be recommended; by this agent several insects can be killed at the same time by a few drops of the fluid. The boxes containing the specimens to be killed, having been opened a little on one side to admit the fumes, should be placed in a large basin or box (a high hat is often handy) with a few drops of the liquid on a sponge or piece of wadding, and the whole covered over with a towel or cloth. In little over half an hour the insects will be ready for setting. The great drawback, however, to the use of ammonia, is that the fumes hang about the boxes so that they cannot be used for other captures immediately afterwards, but require to be left open for an hour or two to air. Chloroform, on the other hand, is free from this objection, but is very apt, unless with careful handling, to render the specimens rigid and difficult to set. I have, however, used it for several years, and consider it preferable to all other poisons. A strip of blotting-paper dipped in the chloroform is inserted in the pill-box containing the insect to be killed, which in a few seconds may be set, and the blotting-paper is free for another victim; and so on, taking care never to kill more than one or two specimens at a time, and to set each specimen as soon after death as possible, and before *rigor mortis* has had time to set in.

From these few hints, which I trust may be of service to those about to commence the study of the Tortrices, I will next month pass on to the list of the species occurring in the south-eastern counties.

1, Duncan Terrace, N.

LOCALITIES FOR BEGINNERS.

No. II.—RIDDLEDOWN.

By JOHN T. CARRINGTON.

I KNOW few greater luxuries than an afternoon stroll over the breezy Surrey downs when one suddenly alights from the train, after a short ride of some forty minutes from the hot and crowded

London streets. There is no pleasanter than Riddlesdown, which is quite a typical chalk down. It is covered with short, turfy grass, which is thickly intermixed with flowering plants, while in many parts are abundant groups of juniper bushes. These bushes are rarely so thick as to interfere with the collector, and are a fruitful source of entomological wealth.

Arrived at either Charing Cross, Cannon Street, or London Bridge Stations, the student may choose one of about a dozen trains daily, and book his return ticket for half-a-crown to Kenley Station. Arrived at Kenley he is positively on the ground, for to his right on leaving the station he sees the Down in front of him. Another way, and one I always prefer when in no hurry, is by East or New Croydon Stations. I use one of these rather than West Croydon, and so save a walk through the not very interesting town. On leaving either of these stations, which are side by side, ask for the Brighton road, and follow it south until you come to the lane leading to Riddlesdown. There used to, and may still, be a friendly post, on which you read that there is a pretty walk across the Down, an unusual addition to the common guide-post. Until this point is reached, which is about a mile and a half from the station, there is little of entomological interest. The road now leads under a railway arch, leaving to the left the celebrated Purley oaks, where much collecting was done in the last generation. From that point collecting is good right up to Riddlesdown proper. In this lane, which has fine rough hedges on each side, I have frequently had a good evening's sport. It is a good locality for Tortrices; and on some evenings Geometers are in such abundance as to puzzle even a smart collector. In fact a much greater variety of moths will be found in this lane than on the Downs farther on.

The hedges contain a good variety of shrubs, such as hawthorn (*Crataegus oxyacantha*), mountain ash (*Pyrus aucuparia*), wild service tree (*Pyrus torminalis*), several roses and blackberries, broom, guelder rose (*Viburnum opulus*), hazel, willow, spindle tree (*Euonymus europæus*), and several others. Over these trail magnificent masses of traveller's joy (*Clematis vitalba*), and here and there the beautiful bryony (*Bryonia dioica*), with its fine vine-like leaves and red berries in autumn.

In this lane the young collector may take several butterflies which are well worth looking after. *Gonepteryx rhamni*, *Satyrus Megæra*, *S. Semele* and *S. Tithonus*, *Polyommatus Phlæas*, which

should be examined for varieties, as should all the blues, several of which occur both here and farther on the Downs; for instance, *Lycaena Agestis*, *L. Adonis*, *L. Corydon*, with *L. Argiolus*, on some hollies in the hedge enclosing the Downs to the right of Kenley Station. *Pieris Daphidice* has been taken either in the lane or on the Downs.

Geometers may be disturbed from the hedges during the day-time with the beating-stick; but in the dusk of evening they are, as I have already said, common enough. Amongst them are to be found *Selenia illunaria* and *S. illustraria* in early spring, or during their summer brood; *Hemithea thymiararia*, *Acidalia ornata*, several *Eupitheciæ*, *Melanthia ocellata*, *Melanippe procellata*, *Anticlea rubidata*, *Phibalapteryx vitalbata*, *Scotosia vetulata*, and *S. rhamnata*. As for Tortrices and Tineina their name is legion.

Even of such nice species, as are many of those just mentioned, one gets tired in time, and strolls forward on to the open Downs. The road we have just come along crosses the top of Riddlesdown. Following it for a few hundred yards we find to the left a small wood of mixed trees, but chiefly oak, with a very thick undergrowth of hazel, &c. I have frequently worked in this wood, but seldom got much in it to repay the time spent there. It seems too thick, if the undergrowth has not since been cut.

On the right of the road is the open Down, sloping with southerly aspect to the bottom of the valley, along which runs the Caterham high-road past Kenley Station. On this Down the juniper (*Juniperus communis*) is the most striking object: these bushes, about two to five feet high, should at all periods of the year be worked; several species of Lepidoptera are peculiar to them. In October and November, when most other species have "gone to their rest," *Thera juniperata* often occurs in great abundance. Little else is to be then taken, and these best by night when flitting on the lee sides of the bushes. I always think it melancholy work when taking this species: it is the end of the season, and then in the darkness of night the junipers are weird and sombre-looking, especially when the wind sighs so sadly through them. Much more lively work, although you seldom make such a big bag of boxes filled with one species, is in August, when we should hunt for the scarce and local *Chrosis rutilana*. The imagines of this species are occasionally to be disturbed by day when beating the bushes; or by smoking the

ground under the lower branches ; but great care should be taken not to fire the bushes, unless one is a candidate for one's name appearing in the police column of the newspapers. I have rarely heard of large bags of this species being made, but I once got about three dozen on one afternoon. While looking for *Rutilana* I have frequently disturbed fine specimens of *Cerigo cytherea*, and these chiefly females. I never remember taking females at sugar ; they are therefore often wanted by correspondents. One of the commonest moths from these junipers at the same time is *Eupithecia sobrinata*, which are at Riddlesdown sometimes especially fine and well marked. At the farther end of the Downs from Croydon are a few stunted yew trees (*Taxus baccata*) ; these are worth overhauling, for from them I have often got moths I wanted ; I have found *Lithosia deplana* in them when beating the branches.

Amongst the grass on the open Downs we find most of the usual chalk-down plants, as well as wild thyme (*Thymus serpyllum*) in abundance, several vetches (*Viciæ*), bird's-foot trefoil (*Lotus corniculatus*), wild mignonette (*Reseda lutea*), hound's-tongue (*Cynoglossum officinale*), devil's-bit and field scabious (*Scabiosa succisa* and *Knautia arvensis*), &c. By looking under the shady bushes may be sometimes found orchids of some rarity and of exquisite beauty, *Orchis purpurea* being one of these.

By sweeping the ground gently on fine afternoons throughout the summer, many good and some rare Micro-Lepidoptera may be taken. One of the species for which Riddlesdown is noted is *Eriopsela fractifasciana*, which occurs in early spring and again in August. Of the genus *Phycis* occurs *Adornatella* and its nearly the beautiful *Ilithyia carnella*. *Crambus geniculellus* and *C. inquinatellus*, the latter frequently, the former commonly. Among the Pyralides, which are particularly well represented, are *Pyrausta purpuralis* and *P. punicealis*, while *Herbula cespitalis* is very abundant ; and probably others of greater rarity, if carefully worked for. In fact, I should often remind my readers how necessary it is to box everything about which there is the slightest doubt, for further examination. How frequently does a rarity get overlooked in mistake for something common. As I said in my last article, beginners have proverbial luck ; but I have no doubt this is to be solely attributed to the fact that, wanting almost

everything, they box all before them. On a fine sunny afternoon in July or early August the whole herbage literally swarms with Tortrices and Tineina. *Sericoris cespitana* is common; *Euchromia purpurana* rare at times; while *Phoxopteryx comptana* is, as on all chalk downs, in countless thousands.

Feeling tired of the Downs the entomologist may wander down to a large chalk quarry at the end farthest from Croydon. Here he will find *Lycæna Corydon* commonly, besides other species, to repay a visit. There is another old quarry at the end of the road from the Downs, where it joins the Caterham Road. Here is a more varied growth with plenty of viper's bugloss (*Echium vulgare*), with its pretty groups of bright blue flowers; also some fine plants of mullein (*Verbascum*), I forget of which species. On these I once found a batch of shark larvæ (*Cucullia verbasci*); but while I was making a fine haul of them an irate publican; from the public-house opposite, ignominiously turned me out. That is the only time I have been interfered with on or near Riddlesdown, where I have no doubt on nearly every occasion the collector may work away in peace. I am not aware whether there is any right to wander or no over these Downs, but I have never been otherwise questioned.

There are some good-looking meadows at the bottom of the valley. Never having worked them I cannot say much about them, but I have heard that sometimes *Acontia luctuosa* is to be taken—by the collector who can run—flying over the clover fields. All the valley seems good up towards Caterham. There are other Downs in the neighbourhood, on one of which, Purley Down, the junipers are larger and older, some ten or more feet high, but I have always done better on Riddlesdown with much the same fauna. Purley Down is to be reached by turning to the left from the Riddlesdown lane soon after leaving the Brighton Road. Passing also under a railway arch through the old Purley oaks, straight on until an unfinished and abandoned railway cutting is reached, when Purley Down will be seen on the right. I understand this is more strictly preserved, and the collector may be asked to leave sometimes.

I have never sugared on Riddlesdown, or in its neighbourhood, but it would be well worth trying. A train leaves Kenley just after 10 o'clock p.m., but trains from West Croydon to London may be got up to midnight, or nearly so.

Riddlesdown is, for the Lepidopterist, one of the nearest collecting grounds to London where may be obtained the chalk-hill species. It is perhaps not quite so good a ground as some others I hope at another time to refer to, but for all ordinary chalk species it is sufficiently good; besides the lanes and hedges in its neighbourhood providing many and some rare moths. When I resided at Norwood, in 1876, I gave it many trials, and never came home with empty pockets.

Royal Aquarium, Westminster, July, 1879.

UNDESCRIBED OAK-GALLS.

By E. A. ORMEROD, F.M.S.



THE accompanying sketches are of two apparently undescribed species of oak-galls: one, the bud-gall, is very plentiful in the neighbourhood of Isleworth; the other was gathered near Maldon.

The bud-gall (which is figured both natural size and magnified) much resembles a stunted form of that of *Aphilothrix collaris*, but is much smaller, and remains to maturity buried in the bud scales. I have found it rather numerous in winter and spring; but as it does not make the slightest show externally, and the buds in which it is contained are not distinguishable from the others, I have only come on it accidentally during search for possible winter developments of details of gall-growth, and the gall-maker has been too much crushed to rear for definition. It

is somewhat oval in shape, single-chambered, with a thin crisp wall; and, from the various conditions in which I have found it, appears to form (accompanying the growth of its larval tenant) during the latter part of winter and beginning of spring, the imago quitting it before the season of expansion of the healthy buds. I conjecture that this very minute gall is much sought after by birds, as in the seasons when I have found most of it I have noticed the buds frequently torn open; and there is no other bud-gall common in the district at that time, as far as I am aware. Possibly some other observer may be able to add the name of the gall-maker.

The other gall figured is very unusual in appearance, and has caused such complete distortion of all the surrounding growths as to make it difficult to convey with the pencil any characteristic forms. As seen magnified it much resembles an abnormal form of *Andricus inflator*. It, however, consists of two oval cells; these are rather thin-walled, placed side by side, and occupying the entire width, and about two-thirds of the length of the irregular hollow chamber formed by the swollen base of the stem in which they are contained, the outer walls of the gall cells and the inner walls of the gall chamber being adnate for (approximately) half the cell surface. The gall cells are not quite an eighth of an inch in length, and were deserted when I found the specimen, the only one which I have seen of this kind, and differing so much from any normal state of bud-gall with which I am acquainted that possibly a figure may be of some interest.

Spring Grove, Isleworth, July 5, 1879.

PEA ENEMIES.

By EDWARD A. FITCH.

DURING this ungenial spring—I might almost say protracted winter—our garden and field crops have suffered severely, since growth has been almost impossible, and the plant has been altogether unable to withstand attack from insect or other enemies. Our pea crops are among the greatest sufferers, and the true nature of the attack is almost universally overlooked. Almost everybody, who has attempted the out-door growth of early peas this year, has been disappointed; in most cases they

are altogether a failure, and few indeed are the gardens in which autumn- or winter-sown peas look really well. The seed germinated kindly, and there was a good early plant. The severe winter weather possibly had its effect, but the great mischief on our garden rows and in general field culture has been wrought since February or March. First the leaves were eaten and notched, and finally the whole plant disappeared.

The most careless observers blamed the ungenial weather; then came those who looked amongst the smaller mammals, as mice or rabbits, for their enemies, but nine out of every ten gardeners, I believe, blamed the much-maligned sparrows. Garden netting and wire pea-guards were brought into requisition, but the peas continued to waste as fast as ever; nor did the tile mouse-traps or the feather stringing avail anything.

The result of these attacks is seen everywhere, for many thousands of yards of pea rows in our gardens have been dug up as useless, and some hundreds of acres in field culture have been ploughed up. The effect is patent, the cause is latent. Where, however, the careful observer took his lantern and examined his gradually diminishing pea-plant after dark, he probably would meet with his numerous, but tiny, enemies in the shape of an insect (*Sitones*), a myriopod (*Polydesmus*), and a crustacean (*Oniscus*); thus would he become satisfied that it was not the slugs, and see why his lime and ashes had not the desired renovating effect.

These destructives have all been especially busy this spring, and with most disastrous results on our green pea crops. The little beetles (*Sitones lineatus*) will be at once recognised when found; but here is the difficulty, as from their general habit of falling to the ground when alarmed they may very easily be overlooked by a casual observer, since their colour and shape is almost a perfect match with the particles of soil amongst which they feign death for a short time. A quick eye, however, they will not escape, and just now pairs of *Sitones* are especially common sitting on the dilapidated pea plants, *in cop.*; they may readily be collected in almost any weather, though they are not above seeking shelter on a rough or inclement evening. In one year (1836) Mr. John Walton collected and set upwards of one hundred pairs so taken, and their display, not unnaturally, excited the risibility of the illustrious Curtis. These were used

for specific determination, but here I especially call attention to the pairing, since the life-history of these very abundant weevils is still unknown. It is not difficult to procure eggs, but further than that I believe no one has succeeded. The knowledge of the economy of *Sitones* is not only entomologically important, but is of great utilitarian interest, since very little can be done to destroy the hardy, hybernating, insignificant beetle itself; in its earlier stages it may be less capable of resisting attack.

The well-known and omnivorous woodlice (*Oniscus asellus*) are readily discovered at their evening meals. It is not always they are so destructive to our pea crops, but this year they have, I know from actual experience, destroyed much. The young succulent early peas, where grown near their haunts, was almost the only living vegetable growth to which they could resort. Unfavourable as the seasons have been for plant life they appear to have had quite a contrary effect on the isopods, for I never remember woodlice more abundant.

This latter remark equally applies to that destructive little myriopod, *Polydesmus complanatus*. Several evenings lately I should have had no difficulty in collecting these young creatures by the hundred, and this without traversing much ground and in a comparatively short time; they were so abundant. In many cases I found three, four, and even five on one pea; they were, however, much quicker in getting out of the way than the fat woodlice, and appeared more impatient of light. These light-coloured, almost white, centipede-like creatures may be at once recognised by their deeply cleft segments, each of which bears two legs on each side; they are especially fragile even when living, but when dead and dry they can scarcely be touched without breaking.

These are all contemporaneous destructives to the young peas, and, as I have said, an immense breadth of crop has been already sacrificed. Late sowings and half-plants are now the basis on which the general white and blue pea crop of 1879 rests, and, speaking agriculturally, I must say that to all present appearance this is likely to be a very precarious one. The "louse" (*Aphides*) only needs to be mentioned to be at once dreaded by all farmers; and this year, where the pea growth is so backward and so weakly, it is especially liable to attack. This is a gloomy prospect, so I

will not pursue the subject; should, however, the surmise be correct, as I greatly fear, the 'Entomologist' will contain a further note. I will not meet evils half way in these bad times.

Maldon, Essex, May, 1879.

ECONOMIC ENTOMOLOGY.

By STEPHEN FITZWILLIAM.

(Continued from p. 179.)

NOT only the 'Times' of this and other dates, but the 'Morning Post' and other daily papers, might be quoted as showing that Mr. Murray's suggestions had attracted popular attention. Scientific papers and periodicals took the subject up, and as a matter of course it was discussed in journals specially devoted to agriculture and horticulture. Since the conference of June 5th, 1877, however, nothing whatever has been done—nothing towards the further discussion of the subject, and nothing towards keeping the matter under the consideration of the Government. Two years have been wasted.

I have received some information, since the appearance of the first part of these notes, about the collection of Economic Entomology made for the Devon and Exeter Albert Museum by the Misses Ormerod and Mr. D'Urban, to which I hope to refer later on; but at present I wish to keep under the consideration of entomologists the question whether Andrew Murray's efforts to arrange concerted action against our insect foes should be allowed to pass into oblivion or not.

As I said above, perhaps insect damage in England may be overrated. Possibly Mr. Murray may have overrated it when he urged upon the Privy Council that it was a matter requiring their intervention in some way to direct combined action. The fact that the press spoke at the time of the importance of the subject does not prove much, because the writers had no statistics to go upon. Can any one furnish a statement based upon calculation—not opinion, but calculation, however rough—as to the annual losses to the agriculture of our country from insect damage? In the 'Morning Post' of April 5th, 1877, it was said that a rough estimate had been made that the annual losses equalled the cost of the Abyssinian war. It seems that what we especially want

is a trustworthy account of what our losses actually are. If combined action is needed to meet an evil, the first thing to be done is to prove that the evil really does exist to an extent that makes combined action worth the trouble of organizing. Now it is strange, with all our Societies—Agricultural, Entomological, Horticultural, Natural History, Statistical, and others—that not one of them has taken up the systematic collection of facts with regard to insect losses. It might possibly be not very easy to give the losses as expressed in money value, but they might be expressed in acres for crops so damaged as to be not worth gathering, and by weight or measure for those gathered. As none of the existing Societies have done it, it is perhaps worth considering whether it might not be well to organize a Society for this purpose, which might also discuss insect damage and remedies generally.

When we look at the success which has attended Mr. Symons' efforts to get returns of daily rainfall, and remember that he now has 2000 regular observers in the country, and that their record has to be a daily one, it seems hardly too much to expect that well-directed and sustained energy might secure the regular return of statistics of any kind, if it could be shown they were of practical use. It is just possible that there may be difficulties in the way of doing this which have not occurred to me, such as the reluctance of farmers and market gardeners to let their losses be known. If those most familiar with the ways of farmers, market gardeners, &c., see any reason for believing that trustworthy returns of damage could not be obtained, it would be as well that such should be made well known, as then it would be clear we must give up expecting statistics, unless they could be obtained from inspectors appointed to obtain information from their own observations. So far, however, as I know, there would be no more difficulty in obtaining reports of losses by insects than reports of the first appearance of certain flowers or birds, such as we now regularly have. If it is urged that the collection of statistics is rather work for a Government than for a Society, I would ask, in that case, why are not entomologists taking steps to keep the matter under the notice of the Government? Perhaps it is not considered to be a strictly entomological matter. In that case, is it then for Agricultural Societies to keep an eye on the matter, and to memorialize a Government department?

The fact I now am considering is that Andrew Murray seemed

to be very nearly getting some initiative step taken, and that since his death nothing is being done. If what he attempted was on the wrong lines, it would be well if some one duly qualified to do so would point out where it was wrong. If it was on the right lines, is there not any one to be found, or is there not a Society to be found, to continue the work he commenced?

If the statement is anything like an approximately correct one that our annual losses by insect damage are equal to the cost of an Abyssinian war, the matter is far too serious to be ignored. If this is quite wrong it ought to be corrected. No doubt, in thinking of estimates of our losses, the mind is unconsciously influenced by the statistics of American losses. We may feel assured that these statistics show losses far in excess of what we suffer in England; but in the absence of any statistics of our own we cannot help wondering how our own would come out in figures, and being influenced by American figures. It is perhaps hardly fair to allude to American losses from the "Rocky Mountain locust," as we have nothing of the kind in this country; but when we learn from the first Report of the United States Entomological Commission that the losses from the locust ravages during the years 1874—1877 amounted to 200,000,000 dollars (fifty million pounds nearly), we cannot help speculating as to what kind of proportion our losses bear to this. No wonder that Americans have had recourse to legislation for the destruction of locusts!

But though we have no statistics as to the losses we sustain, it seems to have been often recognised that they are of sufficient magnitude to be worth the attention of the Government, for the purpose that they in some way should direct action. In considering what should be submitted to our Government for them to undertake, it is instructive to look at what other nations have done.

Let us first take France. An official abstract of French legislation on the subject is fortunately ready to hand. The 'Journal Officiel' for June 28th, 1876, in giving the *proposition de loi* relative to the *projet de loi* drawn up and presented by MM. de la Sicotière, Grivart, and the Comte de Bouillé, had fourteen columns occupied with the history of legislation. It does not go back farther than the earliest civil war of 1732, but those who have read Boisduval's 'L'Entomologie Horticole' will remember his reference to ecclesiastical fulminations against

insect depredators, where he cites two old records, one of 1120 and another 1516, which show that caterpillars and cockchaffers were ordered to take themselves off within six days under pain of excommunication. The earliest attempt at legislation referred to in the 'Journal Officiel' is the law of 1732, which ordered farmers and landowners to destroy caterpillars, the fine for neglect being 50 livres. This law of 1732 was renewed by prescriptions in 1777 and 1787. [In 1791 the destruction of harmful animals and birds was added to the existing law.] During the Revolution, however, the fines were done away with, and rewards were offered instead. The result was found to be that nothing was done. Then followed the law of 26 Ventose, IV. (February 17th, 1796), which, in spite of all the subsequent attempts at legislation, still* remains the only law, and this is practically inoperative. It ordered the destruction of caterpillars by the owners or the tenants of land; that the public lands were to be cleared by the agents; and that the adjoints were to be responsible for seeing the law carried out in their arrondissements where they found it neglected. They were required in such cases to engage workmen to do the work, and to recover the cost from those who should have done it. Within twenty days from the date fixed the *commissaires du directoire executif* were to visit the districts to see the law had been duly carried out, and to report to the minister. The penalty fixed was not less than three nor more than ten days' labour in addition to the repayment to the officials of the cost of the workmen they employed. It is hardly to be wondered at that this law should not be put in force. I recollect that at the congress held in September, 1876, in Paris, in connection with the "Exposition des insectes utiles et des insectes nuisibles," Mr. Murray elicited from M. le Baron de Pelletier, for many years maire of Lafarté, Melan-Aisne, that he knew many cantonments where no conviction had been attempted for more than twenty years; and as for himself, he had never attempted to make any, since he did not see any use in clearing certain cantonments while in neighbouring ones, under other jurisdiction, the pests were allowed to flourish, and were left to spread. Although this remained law for so long several endeavours were made for other laws.

In 1839 an attempt was made to repeal this law and substitute one that maires would not object to put in force, but, owing to a

* Unless a law has been passed that I have not heard of.

dissolution, the proposed law was not passed. Again, in 1849, a law was suggested by M. Richard, a distinguished naturalist, which included the useful proposal of an entomological commission of three to five members for each prefecture. This was referred to the Committee of Agriculture.

In 1851 another attempt was made to introduce the bill in modified terms, but this time the *coup d'état* interfered with its progress. All these attempts show that it was not indifference to the importance of the subject that has prevented the substitution of a fresh law for the impracticable law of Ventose. In 1872 M. Ducuing introduced a *projet de loi*, which was really the basis of the *projet* introduced in May, 1876, by MM. de la Sicotière, Grivart, and the Comte de Bouillé. It was taken into consideration on the 21st of March, 1873, and referred to a committee. The first reading was on the 10th of December, 1874; the second on the 5th of January, 1875. M. Ducuing died before the end of the session, and before his report on the amendments was completed. The *projet* presented in May, 1876, by MM. de la Sicotière, Grivart, and the Comte de Bouillé includes the spirit of the amendments. In the "*exposé des motifs*" they state that their only aim is to give legislative power and executive force to those views of which every one has long recognised the importance. They give several facts and figures as to the amount of damage done, and urge that the importance of legislative interference in such a matter has been recognised since 1796. They propose to extend to all harmful insects the law of Ventose IV. The chief provisions of their *projet* are that the destruction of the insects shall rest with landowners and tenants; the prefect, after consulting the conseil-général, shall notify the times to be selected for the destruction, as well as the methods to be employed for the different species. Arrangements are made for public lands, roadsides, and land bordering on railways. The maires and commissaries of police are to see the law carried out. In case of neglect the authorities are to have the work done and recover the cost from those who should have done it; and the fines are to range from ten to twenty-five francs for a first offence. The carrying out of the law is to be left with the Minister of Agriculture and Commerce; it is to extend to Algeria.

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

THE WEATHER, AND ITS EFFECTS ON LEPIDOPTERA.—*Apropos* of Mr. J. Jenner Weir's suggestion in the July number (Entom. xii., 179), I venture to give a few notes from my diary on the times of emergence of certain species of Lepidoptera in confinement, contrasting last season (1878), which was rather an early one, with the present unusually late one, collecting, for example, half a dozen species which I have reared numbers of each year. On account of the retardation in the advancement of vegetation this spring many of the hybernating larvæ did not make their appearance until very late; notwithstanding this I have found many to be more abundant than usual, the long and severe winter not diminishing their numbers. I usually begin searching for larvæ as soon as the hawthorn hedges show any signs of budding. *Orgyia fascelina* is generally the first to appear, and the earliest day I could find that species this year was April 6th; last year I found it as early as March 7th. The following species, kept indoors under similar conditions each season, will also show, in most cases, a great difference in the time of emergence:—*Smerinthus ocellatus* this year came out on July 9th; last year they first appeared on May 17th. *Sphinx Ligustri* first emerged this year on June 18th, compared with June 1st last year. The first imagos of *O. fascelina* this year emerged on June 29th; last year the earliest date was June 13th. Exotic species have also been affected to a considerable extent. *Attacus Pernyi* first appeared this year on May 26th; last year they were much earlier, the date being April 11th. *A. Cecropia* first "arrived" on June 22nd; last year this species began to emerge on May 11th. Another species, *A. Cynthia*, first came out on July 5th; last year the first emergence was on May 22nd. As the length of time is considerable in which some of the above-mentioned species are in the larval state—that of *A. Cecropia* being about ten weeks—it will be very late in the autumn before the larvæ are full fed. Yesterday (July 4th) a specimen of *Dicranura Vinula* emerged from the pupa; this species in an average season is due in May or early in June.—R. LADDIMAN; Norwich, July 5, 1879.

THE EFFECT OF THE LATE SEASON ON PUPÆ.—The date given by Newman and others for the appearance of *Orgyia pudibunda* is

May. Last year my specimens began to come out on 24th April; the year before on the 21st of the same month; but this year, in the same breeding-case and the same situation, the first did not make its appearance till to-day (June 4), about six weeks after time. So, though not with quite so remarkable a difference, the *Cucullia verbasci* have been about a month later than last year.—Rev. J. CAVE-BROWNE; Detling Vicarage, Maidstone, June 4, 1879.

NOTES ON THE SEASON.—PYRAMEIS CARDUI.—I can fully agree with Mr. Eedle as to the abundance of this insect. This year they were so plentiful that I took them in the garden close to the house, but they only continued for two days, for the heavy rain and wind drove them away. This is a very remarkable season both for larvæ and imagines. Larvæ that were abundant last year, such as *Auriflua cæruleocephala* and *Hybernica defoliaria*, are this year quite scarce, and *Tæniocampa stabilis* and many of the Geometers are plentiful. In May the little *Noctua plecta*, *Plusia gamma*, *P. iota*, &c., came to the raspberry blossom, and they have not turned up since. I used to capture them in August at the honeysuckle. On July 18th and 19th I was beating the oaks for larvæ, and to my great surprise captured *Agriopis aprilina*, and on the 20th my daughter found two *Amphydasia betularia* reposing upon the sweet pea; all were in splendid condition. Has the season anything to do with the pupæ that they should emerge earlier or later than usual, and why after a great scarcity does the next year bring forth in abundance?—S. BRADBURY; Abbots Bromley, July 22, 1879.

NORTHERN NOTES ON THE SEASON.—From every quarter comes the same lament of “no moths; wet, cold, miserable weather.” Everything that does turn up is very late: just fancy *Cidaria suffumata* out on June 26th; this *Suffumata* I shall remember. Being out nothing, and on a bridge which crosses a mountain stream, I was full stretch with my net on the end of my stick trying to reach an *Argyresthia* on a mountain ash, when down came all the rotten fabric and plunged me into the pool. As soon as I got breath from the cold shock I saw a moth under the bank, which was this *Suffumata*, which I must have splashed out. The weather keeps so bleak and cold and stormy that it is difficult to find a sheltered corner. However, last Saturday I

had an exploration of new ground on Greenthorn Fell, about three miles from here, and a mile or so from Stoneyhurst College. I note this specially lest any student there turns entomologist. It is just the place even for a new butterfly to turn up: acres of bilberry (knee deep), fine clumps of larch and Scotch fir plantations, fine old oaks, birch and alder, as well as beech, spruce, &c. On the hill-side grows the *Arctostaphylos uva-ursi*, from which I gathered a lot of *Tortrix* larvæ, and took *Lithocolletis vacciniella*, both the moths and the larvæ; also *Nepticula Weaverella*, and in the bilberry shoots larvæ abounded; and to note a few other species, even bad as the day was—*Gelechia longicornella*, *Coremia ferrugata*, *Melanippe tristata*, *Acidalia fumata*, *Eupithecia lariciata*, *Acronycta menyanthidis*, *Phoxopteryx myrtillana*, *Lasiocampa rubi*, and *Thecla quercus*, as well as other species. I found empty pupa-cases of *Dicranura bicuspis* on the alder. This makes me anxious to pay more visits to this charming spot. In the *Genista tinctoria* larvæ of *Depressaria atomella* and *Gelechia lentiginosella*, as well as *Cemistoma Wailesella*, are in plenty; and among a clump of alders I took a score of *Nemophora metaxella*. *Ephippiphora turbidana* is just out, one specimen only. I expect the heavy floods in the Ribble will have washed lots of moths out to sea.—J. B. HODGKINSON; Dutton, Ribchester, July 6, 1879.

PYRAMEIS CARDUI AND COLIAS EDUSA AT BROADSTAIRS.—In the latter part of June *Vanessa Cardui* was very abundant, especially in the neighbourhood of the North Foreland Light-house; frequently when I was sitting by the roadside they would alight close by me. I also noticed a few specimens of *Colias Edusa*; three which I caught were all males.—HORACE FRERE; Sunny Bank, Queen's Road, Kingston-on-Thames, July 11, 1879.

ACHERONTIA ATROPOS NEAR FOLKESTONE.—A very fine specimen of *Acherontia Atropos* was brought to me on the 4th June this year, in good condition and newly emerged. Is this not very early?—W. H. CHEESMAN; Coolinge, Folkestone.

ACRONYCTA ALNI IN TILGATE FOREST.—I had the pleasure of taking, at sugar, *Acronycta alni*, in splendid condition, in Tilgate Forest, on June 16th.—C. HAMLIN; Brantridge, near Crawley, Sussex, July 20, 1879.

LITHOSIIDÆ IN THE NEW FOREST.—I agree with Mr. Lockyer (Entom. xii. 166) as to the rarity of *Lithosia complanula* in the New Forest; but my experience of that district does not enable me to confirm his statement as to the “entire absence of *L. mesomella* from the extensive heaths.” On the contrary, I have always found *L. mesomella* the commonest of the Lithosiidæ in the New Forest, except *Calligenia miniata* and—in some seasons and localities—*L. quadra*. I have frequently taken from ten to fifteen specimens of *L. mesomella* in the course of an evening in various parts of the forest; and I may mention the heaths lying between the Southampton and Beaulieu roads, near Lyndhurst, and the “*Cribrum*” heath, near Ringwood, as the localities in which I have found this species most common.—H. GOSS; Barmouth, Merionethshire, July, 1879.

OCCURRENCE OF PACHETRA LEUCOPHÆA AT BOX HILL.—While collecting at the above locality, on July 13th, I was fortunate enough to capture a fine pair of this rarity, *in cop.*, on the trunk of a fir tree. They were exposed to the full force of a gale of wind and rain from the south-west, which had been blowing all the morning. On trying to get them into a large pill-box, they parted—no doubt being on the point of doing so before I touched them. The female has since very obligingly laid about 270 eggs, and I am rather interested to know how they will emerge, as they are laid very irregularly in one mass, but in four distinct layers, one layer on top of the other, so that one portion of the batch is four deep. The egg when first laid is yellowish green, round in shape, with the top of the shell wrinkled and drawn a little upwards; they have since changed to a dark drab, with the centre almost black, and the wrinkled portion a bright silvery colour, so that I expect in a few days they will emerge.—G. ELISHA; 122, Shepherdess Walk, City Road, N.

EARLY APPEARANCE OF MELANTHIA OCELLATA.—I found a pair of very fine specimens of *Melanthia ocellata* in cop. under an apple tree, in the vicarage garden, on June 12th, apparently just out of pupæ.—H. MASTERMAN; Clavering Vicarage, near Bishop's Stortford.

CAPTURE OF ARGYROLEPIA SCHREIBERSIANA.—I have been fortunate in capturing some good specimens of this rare and pretty species, whilst flying over mixed herbage and grass. At

present I am unable to give its food. From observations obtained, I fear there will be but little chance of breeding it. Could it be bred it would be an elegant species. The daily rains have made it most difficult to procure fine specimens.—F. O. STANDISH; 8, St. Paul's Terrace, Cheltenham, July 19, 1879.

PENTHINA POSTREMANA.—I have been fortunate again to have bred this lovely species, a specimen emerging yesterday.—J. B. HODGKINSON; Dutton, Ribchester, July 6, 1879.

DESCRIPTION OF THE LARVA OF RHODOPHÆA FORMOSELLA.—Larvæ of this species I received on October 3rd, 1877, from Mr. J. R. Wellman, of London. They were full grown, about five-eighths of an inch long, and of moderate bulk in proportion. The head has the lobes rounded, is a trifle narrower than the second, but quite as wide as the third segment. Body cylindrical and of nearly uniform width throughout; the skin has a slightly wrinkled and velvety appearance, except on the second segment, where it is smooth, and has a rather polished horny appearance: there are a few scattered hairs. Ground colour, dark velvety green; head of the same colour, but very faintly and indistinctly freckled with grayish. Two fine interrupted grey lines extend throughout the dorsal area; below them is a similar subdorsal line, followed by two more similar lines between it and the spiracles; and again a similar one along the spiracular region: there thus being five of these grey lines on each side. Spiracles imperceptible. Ventral surface uniformly dark green, powdered, especially at the segmental divisions, with whitish.—Geo. T. PORRITT, Highroyd House, Huddersfield, June 4, 1879.

NEMOTOIS SCHIFFERMILLERELLA BRED.—From the larva of the above insect, mentioned in last month's 'Entomologist,' I have at present bred—two lovely specimens on July 16th, three on the 18th, and one the next day; so that I am in hopes of breeding a nice series. They seem to emerge from 10 to 12 A. M., and are very active soon afterwards, particularly if the sun shines on the cage. It is very satisfactory to know they have proved to be the species they were expected to be.—G. ELISHA; 122, Shepherdess Walk, City Road, N.

SITOPHILUS ORYZÆ.—In the course of last year I had an opportunity of making some observations on the life-history of the *Sitophilus (calandra) oryzae*, published in the February number

of the 'Entomologist,' in which, though able to trace the larva onward in its development, and also able to find the punctures of oviposition in the corn-grains very numerous, I failed to discover what I could feel absolutely certain were the eggs. I found minute ovate spherical bodies (Entom. xii. 52), both in the corn and in the weevils, but could not feel perfectly sure of their nature. In the course of the last few days I have received a paper by Professor C. V. Riley on the subject of the rice weevil, printed in the March number of the 'Farmers' Review' (Chicago), which leaves no doubt on my mind that these objects were the eggs, and his full description will be of interest. He says, regarding the position of the egg,—“The puncture is somewhat curved, rather less than one-sixteenth of an inch deep, and rather narrower at the bottom than at the opening. The egg, which is 0·5 mm. long, elongate, ovoid, and translucent, is pushed to the bottom, and the whole space above it is then filled in with particles of grain gnawed into a fine powder like flour, the orifice being pasted with a little saliva.” Professor Riley's article gives much practical information, but from my own observations of the habits of this and the closely-allied species, *S. granarius*, I should like to add to the remedial and preventive suggestions the plan of trapping by setting vessels of water, as far as experiment with the pests of one badly infested granary can be trusted: the weevils would in this way be attracted from the corn in enormous quantities, and easily destroyed by throwing the stupefied insects into the fire.—E. A. ORMEROD.

CECIDOMYIA TRITICI.—This is indeed a curious season. This evening the wheat midge (*Cecidomyia tritici*), parent of that injurious pest the “red maggot,” is especially abundant, and there is not a wheat ear to be seen.—EDWARD A. FITCH; Maldon, Essex, June 27, 1879.

REVIEW.

A Synopsis of British Butterflies. By J. T. OPENSHAW. Second Edition. Watson Joll, 25, Bull Ring, Horncastle.

THIS is a simple synopsis of the British butterflies, printed on a card, so that it may be always at hand for the student. The card is divided into five columns headed as follows:—Name, Larvæ, Food-plant, Pupa, Month of Exit. The following is

an example:—*Argynnis Paphia*; black-yellow lines; violet, nettle, wild raspberry; grey-silver spots; July. The idea of this synopsis is a good one, but it might be much further developed. More attention might also be paid to the food-plant; for example, *Thecla rubi* is said only to feed on bramble and broom, its usual food, birch, not being mentioned. This card will be found, nevertheless, of use to the collector of butterflies, and is well worth the small sum charged for it.—ED.

OBITUARY.

THOMAS WEST.—It is with much regret that I have to announce the death, at the age of thirty-eight years, of Mr. West, of Liverpool, since its formation one of the best-known members of the Lancashire and Cheshire Entomological Society. By occupation a fitter in a Liverpool engineering works, he added to a pure delight in nature a technical knowledge of Entomology, and a power of laborious and patient investigation which would have made him known to a wider circle had the circumstances which surrounded him been more congenial to the pursuit of his favourite study. His attention was directed principally to the Lepidoptera, and few men had a more thorough acquaintance with, or had studied more minutely, this group as locally represented. Unfortunately, the result of his researches, except as represented by an excellent collection, passes away with him. Ever ready to impart his knowledge and experience to younger entomologists, his death leaves the society of which he was a member deprived of one of its most useful members. It may be very doubtful how far a too constant attention to any natural study may advantage a man when unguided by the education which would teach him its proper place and value. Still, it must be a subject for congratulation that there live among the working classes of our large towns men such as he to whom has been given a higher appreciation of nature, and the possibility of purer and more profitable recreation than is possessed by the majority of their fellows in the same walk of life. The widow and family of Mr. West having been by his sudden death left in great destitution, a fund has been initiated by the society to which he belonged for their relief. Contributions are received by the Secretary of the Society, 6, Colonial Chambers, Temple Street, Liverpool.—W. E. SHARP; Hon. Sec., Lanc. and Ches. Ent. Soc.

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LOCALITIES FOR BEGINNERS.

No. III.—DARENTH.

By JOHN T. CARRINGTON.

HAVING taken our ticket at one of the London Termini of the South Eastern Railway for the quaint little town of Dartford, in Kent, we arrive there in the course of an hour, for half-a-crown return fare. There is little in the town to arrest our attention, so walking away from the railway-station over the bridge, and leaving the water-mill to the left, we turn sharply to the right, through a narrow passage which leads by an ascending path through a meadow to the road. The first turn to the left leads between two high banks to the Brent—an open space famous for martyrdoms by fire in the reign of Queen Mary, and more recently for a long law-suit between the local authorities and a neighbouring landowner, the latter having laid claim to the property of the people. Just as we get on the edge of the Brent there is a footpath on the right, across the fields, which leads to the high road to Green Street Green. Following the road to the right will take us to the "Fox and Hounds" public-house, so well known to the older London entomologists, and immediately under Darenth Wood, better known in the vernacular as "Darn."

The Green Street Green road will be found fine collecting ground up to the wood. Many nice plants grow by the roadsides, and the hedges produce, by beating, some of the best Tortrices and Geometers found in the county of Kent. By examining the flowers of the field-scabious (*Knautia arvensis*) both in the day-time and by night, in July and August, may be found the pretty moths of *Eremobia ochroleuca*, often quite commonly. It is from these hedges that the scarce and local *Tortrix semialbana* has been beaten out in July. Amongst the *Clematis vitalba*, which

hangs in festoons on the hedges on each side of the road, occurs, commonly in July, *Iodis vernaria*, which, when fresh, is of such lovely green colour. In the hollow, where the road opens into a green patch on the left-hand side, was, years ago, the locality of the so-called Dartford blues. They were really, dark forms of *Lycæna Adonis*, and probably an hereditary variety. The posts of the wire fence were famous as a resting-place for the rare and beautiful *Xylomiges conspicillaris*, where they have on several occasions been found at rest during the first sunny days of April and early May. The collector, with a quick eye and with a little practice, need not despair of taking this rarity. Amongst some patches of horehound (*Ballota nigra* = *B. fœtida*) in June will be found specimens of the brilliant little rarity, *Nemotois Schiffermillerella*. An interesting account of the discovery of the larvæ of *N. Schiffermillerella* is given by Mr. George Elisha in the 'Entomologist' of this year, at page 183. This species has also been found flying over the elder (*Sambucus nigra*) flowers in the sunshine. An example of the tenacity of an insect in clinging to a locality after most of its food-plant is gone, and other surroundings are changed, may be quoted in *Eupithecia sobrinata*, which is, near this spot, to be bred or beaten from the few stunted junipers which remain. Much, as will be seen from the few foregoing species selected, is to be done by the road-side before reaching the "Darn" wood itself. Quite a multitude of both Macro- and Micro-Lepidoptera occur by the way, and at some seasons of the year enough will be found to occupy the collector for a long afternoon, without actually going to the wood.

Should the day upon which the young lepidopterist first visits Darenth be a summer's day—such as we have this year had to content ourselves with imagining rather than enjoying—his thirst may tempt him to visit the "Fox and Hounds." Should he enter, he ought not to forget that nearly every British entomologist whose works have handed on his name to our present generation has, at some time or other, refreshed his weary body in the same house under similar circumstances. If he has only well read his authors, many pleasant associations will occupy his thoughts during his short rest, in picturing to himself the old times when they used to meet in the very room he now uses. But we have little time for dreaming in this nineteenth century; for even in moth-catching we must push forward if we are to keep

our place in the scramble for success; so let us now go on to the wood.

Darenth—or as I said, more familiarly known as Darn—Wood consists chiefly of oak trees, but there is a fine undergrowth of hazel, birch, sallow, aspens, &c.; while amongst the flowering plants are many which give joy not only to the botanist but to the entomologist. One of the most common is the golden rod (*Solidago virgaurea*); this in some parts is in profusion. Common also are several St. John's worts (*Hypericaceæ*); while in spring the wood is covered with masses of bluebells (*Endymion nutans*) and primroses (*Primula vulgaris*). In the surrounding fields is plenty of ragwort (*Senecio Jacobæa*), the flowers of which, as is well known, are prolific, whether for larvæ of *Eupithecia*, &c., or for attracting many moths both by day and by night, in August and September.

A path, which turns to the left of the "Fox and Hounds," will take us to what is known as the Four Leet, meaning the meeting of four paths or rides in the wood. Of these four, that to the left is closed, but, so far as I know, the other rides in the wood are now open. In the good old times—and it seems safe to say that all old times were good—*Apatura Iris* used to frequent the oaks here about; while *Argynnis Paphia* and *A. Aglaia* still remain. Much good work may be done in the daytime on most days during an ordinary season by beating the trees by the side of the paths, as well as by sweeping the grass in the rides. Amongst the many species of Lepidoptera to be captured, there are, in the daytime, *Chelonia plantaginis*, *Stauropus fagi*, by searching trunks of trees; *Sesia culiciformis*, round the birches. Amongst the bushes may be disturbed—*Platypteryx falcula*, *P. lacertula*, *Geometra papilionaria*, *Selenia lunaria*, *Corycia taminata* and *temerata*, *Eupithecia expallidata*, *Himera pennaria*, *Hybernia defoliaria* and *Cheimatobia boreata* in their respective seasons.

At sugar, which is best applied on the outskirts of the wood and by the sides of the rides, many charming species of Noctuæ may be taken, such as *Thyatira batis*, *T. derasa*, *Cymatophora duplaris*, *Acronycta tridens*, *A. leporina*, *A. aceris*, and *A. alni* has been taken. *Dipterygia pinastri*, *Cymatophora ocularis*, *Cerigo cytherea*, *Agrotis saucia*, *Triphæna janthina*, *T. fimbria*, *T. interjecta*, *Noctua glareosa*, *N. triangulum*, *N. C.-nigrum*, *Orthosia*

suspecta; *Cerastis erythrocephala* has also been taken. *Xanthia citrigo*, *X. silago*, *X. cerago*, *Epunda lutulenta*, *E. viminalis*, *Agriopsis aprilina*, *Aplecta herbida*, *A. tincta*, *Hadena protea*, *H. suasa*, *H. contigua*, *H. genistæ*, *Calocampa vetusta*, and *exoleta*, with several *Cucullia* and *Catocala nupta*.

Another fruitful source of entomological riches is the ivy in autumn. No sooner are the flowers well out on the bushes, which are to be found in many places, not only on the roadsides from Dartford but also in the wood, than many rarities are to be captured while enjoying the sweets of the flowers. Amongst these are, in the daytime, the *Vanessidæ*, while at night the ivy is frequented by many of our rarer *Noctuæ*; but while working it, it is well to have with us a little weak ammonia, to be applied as an antidote for the wasp stings, to which we are liable from the many wasps which sit on the flowers in a state of semi-intoxication.

The sallows at Darenth are not numerous, but they are good. So soon as they break into yellow bloom in spring, do we find them occupied, after dusk, by nearly the whole of the genus *Tæniocampa*, amongst these *Miniosa* not uncommonly. Also hybernated specimens of many *Noctuæ*,—the females of which should be kept for ova,—*Hoporina croceago*, *Calocampa vetusta*, and *C. exoleta*; also *Xylina semibrunnea* and *petrificata* are amongst the scarcer.

In the fields surrounding the wood much good work may be accomplished. In those now occupied by the Asylum, *Agrophila sulphuralis*, *Acontia luctuosa*, in profusion; *Pyrausta purpuralis*, commonly; with *Spilodes palealis* amongst the wild carrot (*Daucus carota*), upon the flowers and seeds of which they feed, used to occur; and I have no doubt most of these species will be found in other fields in the immediate neighbourhood. In these fields also the ragwort should have especial attention, for at the flowers by night many *Noctuæ* and *Geometers* may be taken by the aid of a lamp in August and September. At the gas-lamps, on the homeward journey, if any room still remains in our boxes, many moths will be found attracted by the light; *Cirrhædia xerampelina* amongst them, late in August or early in September. When this handsome moth was rarer than now, I have many times scraped my shins—and was pleased to do so—to get a specimen down from a lamp. But one day I bethought myself of the better way of looking for them, when drying their wings

immediately after emerging from the pupa, about a foot or two from the ground, on the boles of the ash trees (*Fraxinus excelsior*). I was rewarded, much to my astonishment, by finding some fifty specimens "finer than bred," on my first search. I believe there are not many isolated ash trees near Darenth, and, as may be well understood, isolated trees are the best; but such as there are ought to be searched in the afternoon and evening before dusk. I think it not improbable this style of collecting might be carried further with advantage. I know in some Scotch fir (*Pinus sylvestris*) woods, *Thera firmata* occurs in a like manner, for I have frequently taken a fine series, with limp wings, by looking for them on the fir trunks an hour or two before dusk.

On the flowers and leaves of the golden rod should be found the larva of *Cucullia asteris*, *C. gnaphalii*; also larvæ of *Ennychia octomaculalis*, while at the same time are those of *Eupithecia expallidata*. On the aspens (*Populus tremula*), are larvæ of *Dicranura furcula*, *D. bifida*, and *D. vinula*; also *Clostera curtula* and *C. reclusa* in spun leaves. *Tethea retusa* and *T. subtusa* are there feeding, like the *Closteras*.

In the wood and in the neighbourhood many rare and beautiful Pyrales and Tortrices occur. Some at sugar, for instance *Hypenodes albistrigalis* and *Phycis roborella*. In the dusk of evening may be taken, on the wing or during the day disturbed from the trees, *Scoparia basistrigalis* and *S. Zelleri*: the same applies to *Sarrothripa Revayana*, *Halias quercana*, *H. prasinana*, *Leptogramma literana*, *Penthina prælongana*, *Sericoris bifasciana* (rarely), *Phoxopteryx ramana* (commonly), *Phlæodes immundana* (occasionally); *Eupæcilia maculosana*, frequently in abundance; *Spilonota simplana*, rarely; and many good Tineina.

On an elm tree (*Ulmus campestris*), in front of the "Fox and Hounds" Inn, may, in most seasons, be found a brood or two of larvæ of *Vanessa polychloros* in June. The pupæ also are often to be found hanging under the window-sills, &c., of the same house a little later in the season.

Perhaps the best months for the capture of lepidopterous larvæ, by beating the trees and bushes, are August and September. Darenth Wood is a fine place for the purpose. Many larvæ have been taken there, such as *Sphinx ligustri*, *Macroglossa fuciformis*, from honeysuckle (*Lonicera*); *Limacodes testudo*, numbers of

Geometers, and *Stauropus fagi*, off oak and other trees; *Notodonta camelina*, *N. carmelita*, *N. dictæa*, *N. dictæoides*, *N. dromedarius*, *N. ziczac*, and many Noctuæ off the oak and birch.

Little difficulty may be feared from interference from the proprietors. But should that occur there is plenty of work to engage us on the paths through the wood, and in the neighbouring lanes, especially towards Greenhithe. Altogether Darn may be set down as one of the best woods for Lepidoptera in the London district. Many have been the rarities taken there, and I hope many more may still be taken. I have to thank Mr. Farn for much information about Darenth.

• Royal Aquarium, Westminster, S.W., August, 1879.

NOTES ON SPERCHEUS EMARGINATUS, &c.

By VINCENT R. PERKINS.

THIS rare insect has been added to my collection through the kindness of my friend, Mr. T. R. Billups. During the few fitful gleams of sunlight which have penetrated through the aqueous clouds so very prevalent this season—I will not call it summer—he has taken several opportunities of visiting and examining the ditches and ponds in the eastern or south-eastern districts of London for aquatic Coleoptera and other insects therein contained. I have to thank him not only for this insect but also for other Coleoptera which I had not met with, as well as for a fund of information relative to the habits of these insects, which is certainly very interesting.

This *Spercheus* is, I imagine, in very few collections, and some coleopterists say it has not been met with for many years—for a period so long that it has been reckoned among the things that no longer occur in this country. Many collectors had given up all hope of meeting with it, and have omitted it from their desiderata, leaving no vacancy for it in their cabinet. It turned up, however, as most other varieties do, in a most unexpected manner. One day last season a small ditch, which had been cut for the purpose of irrigation, after a heavy thunderstorm, became full to overflowing, and Mr. Billups, looking on the escaping water, saw two or three of these beetles floating along on their backs, and fished them out. These he took and showed to his friend, Mr. Champion, who at once pronounced them to be the

long-lost *Spercheus*. Elated with success, Mr. Billups went again, a few days afterwards, to the same place, and was again rewarded in his search, and this time brought home two females carrying their very singular bag of eggs. This season he has worked the same ditch several times during the months of June and July, and again met with the insect in sufficient quantity to spare myself and other friends type specimens. This year males and females were captured, but the majority being females (almost all of which had the egg-pouch attached to the abdomen), he feels convinced that period of the year is the breeding season. The pouch-carrying is most interesting; the bag itself is made of a thick silky material of a pale brown colour, several shades lighter than the insect itself, very closely spun or woven, and slightly inflated, like the bag of a spider. It covers the whole of the abdomen from the middle pair of legs, and is seemingly held in place by the hinder pair, it being greatly indented or pinched in by the knee-joint of the tibiæ.

Spercheus evidently does not, like most other water-beetles, attach her nest to any of the varied water-plants which abound in ditches, but carries it about with her until such time as the eggs hatch and the young larvæ come forth; these are little black things about one line in length, and much resembling other larvæ of aquatic Coleoptera. Each of these bags contains about half a hundred eggs, and in two instances Mr. Billups has counted over seventy eggs in one pouch. He tells me he does not think that the larvæ are plant-feeders, as has been stated, but decidedly carnivorous, whatever the imago may be.

Mr. Rye, in his work on 'British Beetles,' states that in a few hours after disclosing the larvæ from the sac or pouch, the female at once forms another. I question this very much, and believe that only one bag and one set of eggs is produced during a season. My friend has, at the time I am writing, several females which he has kept above two months in his aquarium, and which hatched their larvæ. They were captured in the early part of June, and although they are in the company of males, and are frequently seen *in cop.*, and have plenty of weed and shelter, still there is not as yet (August), at any rate, the slightest sign of a second sac being formed; but no doubt we shall know more about this insect shortly.

Another interesting capture from the same locality is *Hydrous*

caraboides, also with its nest and eggs: this beetle does not carry a pouch about with it like the *Spercheus*, but makes its nidus by rolling up a leaf or anything else that comes in its way. One of the leaves of some pond-weed is generally selected, and it lines this with a thick cottony web-like substance, and in this the eggs are deposited to the number of about thirty or forty.

In 'Science Gossip' for June last there is a paper on *Hydrous piceus*, the great water-beetle, with illustrations, which give some slight idea of the nest, but that which is supposed to illustrate the deposition of eggs in the nest is very incorrect. The eggs are not deposited higgledy-piggledy as represented, but with great uniformity, each being placed side by side with the greatest exactness, standing on end upright, in shape like elongated cylinders.

As regards the nest: the leaf, a floating one, is drawn over from the end towards the petiole, leaving the petiole always uppermost, and the sides are drawn down and firmly fastened to the roll with a kind of gummy secretion, so that the nest is quite water-tight; inside is a thick layer of cottony substance of a pure white colour, and in the middle of this the eggs are deposited, as I said just now, in a horizontal position, side by side. They are about a dozen or so in number, of a beautiful crocus-yellow colour. These nests were plentiful in the beginning of June, but since then none have been met with; the eggs of some of these hatched out very soon after they were brought home, and the larvæ were little thread-like things with enormous jaws, and evidently very rapacious. This insect's nest was generally attached to a leaf of *Sparganium ramosum*, but my friend tells me he has frequently taken it in a pond where nothing grew but *Lemna minor*, and then any floating substance, even pieces of old newspaper, were made use of.

54, Gloucester Street, S.W., August 6, 1879.

THE TORTRICES OF SURREY, KENT, AND SUSSEX.

By WALTER P. WESTON.

(Continued from p. 188.)

IN the following list I have adopted the arrangement of the Doubleday list, and have mentioned the counties in which occur the localities given; but in many instances where the insect is of very

general distribution, and no localities are given, it may be expected to be met with in suitable situations throughout these counties.

Halias prasinana.—Common in almost every wood; it may be taken freely in the evening flying over the tops of the bushes, but generally out of reach of the ordinary net. It is also frequently to be obtained, both in the larva and imago states, by beating oak trees, &c. The pupa is enclosed in a very neat cocoon of a light brown colour, spun between twisted leaves or pieces of bark, and, in the latter case, is not easily detected.

H. quercana.—Not so common as the preceding species, but fairly distributed. It has been taken somewhat freely in Kent, at Dartford and Sevenoaks; and in Surrey, at Croydon and West Wickham Wood: it has also been recorded from Haslemere and Lewisham; and in Sussex from the neighbourhood of Hastings. It comes to sugar, and is easily reared from the larva.

H. clorana.—Tolerably common in osier-beds, where the larva is to be met with far more frequently than the imago. It used to be plentiful along the Surrey banks of the Thames around Hammersmith and Kingston. A single specimen is recorded from Hastings.

Sarothripa Revayana.—Has been met with in all woody localities in these counties, but is nowhere common. I once secured a dozen specimens in one afternoon in a wood at Ashted, but I worked for them the whole afternoon, and found the majority were disturbed from some large holly bushes rather than from the oaks. Its capture is mentioned in every list I have received, the nearest points to London being Croydon and Lewisham.

Tortrix podana, Scop. = *pyrastrana*, Hub.—Tolerably common everywhere, and most abundant in gardens.

T. cratægana, Hub. = *roborana*, Hub.—Widely distributed, but scarce, being usually found in oak woods; it is recorded from Darenth, the neighbourhoods of Gravesend and Sevenoaks, and I have taken it at Folkestone; the Surrey localities are Ashstead and Haslemere, and the Sussex ones Lewes and Hastings.

T. xylostæana, Linn.—Abundant everywhere.

T. sorbiana, Hub.—Not uncommon in oak woods; at Croydon I have found it very common some seasons.

T. rosana, Linn.—Abundant everywhere.

Tortrix dumetana, Treit.—This local species is confined to Sussex, in the neighbourhood of Lewes, where it has been taken in some numbers. As it occurs there in oak woods it appears not improbable that it may be a distinct species from those taken in the fens.

T. diversana, Hub. = *transitana*, Gn.—I have met with this insect abundantly in Surrey among old elms around Esher, and occasionally at Putney. Mr. West records it plentifully from Greenhithe, and it may be expected to be met with wherever old elms occur.

T. cinnamomeana, Treit.—A local and not common species, having been met with in Kent, in the neighbourhood of Dover, and formerly, though not of late years, at Darenth Wood. In Sussex, at Tilgate Forest; while the Surrey localities are Haslemere, Woolmer Forest, Mickleham, and Weybridge. It occurs amongst, or in the neighbourhood of, beeches, and may easily be distinguished from the following species by the white head and palpi of the male and the bright rosy red hue of the female.

T. heparana, W. V.—Common everywhere.

T. ribeana, Hüb.—Common everywhere.

T. corylana, Fab.—Somewhat common, and may be met with in tolerable numbers among hazel and birch trees.

T. unifasciana, Dup.—Common everywhere.

T. semialbana, Gn.—This species appears to be much scarcer than it was in former years, and is now much wanted in collections. Mr. Stainton, in his 'Manual,' gives as localities Darenth and Mickleham, but I have not heard of any recent captures at either locality. Mr. W. West has recorded it from Greenhithe.

T. costana, Fab.—A far more generally distributed species than the preceding, and occurring throughout these counties, feeding on *Epilobium* and various low-growing plants. It is usually to be met with in low or marshy ground outside woods.

T. viburnana, W. V.—Generally distributed, but more abundant on moors and heaths; it is very abundant on the moorland between Uckfield and Tunbridge Wells.

T. palleana, Hub. = *icterana*.—The larva of this species may be far more often met with than the imago; it feeds chiefly on *Centaurea nigra*, and the broad and narrow-leaved plantains. The imago is generally distributed, and may frequently be captured

flying slowly in the dusk along railway banks, roadsides, and broken ground.

Tortrix viridana, Linn.—Only too common everywhere.

T. ministrana.—Generally common.

T. Branderiana, Linn.—Widely distributed, but scarce. It is recorded from several Kentish localities—Darenth, Greenhithe, Folkestone, and others: the imago is not uncommon near Stroud, but flies high and is difficult to catch. It has been bred from Darenth Wood from united leaves of aspen, and the larva is also to be found between united or rolled-up leaves of other species of poplar, and of honeysuckle.

T. Forsterana, Fab. = *adjunctana*, Treit.—Distributed throughout, but not commonly: my friend Mr. Howard Vaughan met with some numbers feeding in rolled-up leaves of ivy in his garden at Bromley, Kent. It appears scarce at Hastings, the Rev. E. N. Bloomfield having only recorded one specimen from that district. It should be remembered that all the insects of this family come readily to sugar, especially if it is put on early in the evening.

Dichelia Grotiana.—Distributed throughout the south-eastern counties, but not abundant; it appears a general feeder, but is more frequently taken among hornbeam, maple, and birch. It comes to sugar freely, and though it appears not uncommon in woody districts, is much wanted in collections.

Amphysa Gerningana.—I have only seen a single example of this insect from these counties, which was taken by Dr. Battershell Gill in a wood in the north of Kent. I had the pleasure of seeing the specimen on his setting-board, so have no doubt as to the locality of its capture.

Leptogramma literana, Linn.—Widely distributed, but not common, in oak and other woods, where it may be disturbed from the boughs and trunks of trees in August and September, when it flies a short distance and then drops and feigns death, and is seldom to be roused a second time, if missed at the first attempt. Hybernated specimens are occasionally to be met with in the spring. In Kent it has been taken at Darenth, Greenhithe, Folkestone, &c.; in Surrey, at Croydon, Haslemere, and West Wickham; while in Sussex it occurs at Hastings and Lewes.

P. scabrana Fab. = *boscana*, Fab.—These insects, which have

now been proved to be only forms of the same insect (Entom. x., p. 303), occur plentifully at Darenth Wood, and I have no doubt in several other Kentish localities. I have seen a single specimen from Croydon, and it is said to occur at Tunbridge Wells and Sevenoaks, but I have not been able to verify the specimens.

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LATE CAPTURES AT FOLKESTONE.—While at Folkestone last month I was not a little surprised to find the first brood of *Lycæna Adonis* still out in fine condition, both males and females; in some instances only just emerged from the pupa. I left on the 19th, the morning of which date I paid my last visit to Castle Hill, where I found this species still out in abundance. I also took a few fresh specimens of *Procris globulariæ* and others worn, and three *P. Geryon* at the same locality; these species, I think, are fully a month beyond their usual time of appearance, and this will make the second brood of *L. Adonis* very late.—J. R. WELLMAN; 14, Portland Place North, Clapham Road, S.W., Aug. 20, 1879.

CAPTURES IN NEW FOREST.—Whilst collecting in the New Forest during the latter half of July, I took a couple of *Macroglossa fuciformis* in fairly good condition. *Boarmia roboraria* was just appearing: I took one at sugar on the 21st. *Diphthera Orion* was fairly abundant, in good condition. *Limenitis Sibylla*, *Argynnis Paphia*, *A. Aglaia*, and *A. Adippe* were also just appearing.—N. C. GRAHAM; Silwood, Tulse Hill, S.W., August 12, 1879.

COLIAS EDUSA AND PYRAMEIS CARDUI.—*Pyrameis cardui* is now excessively common, as it was in the early summer, but all the specimens have a somewhat worn appearance about them, as if they were last year's insects. On the 2nd August I turned out of a clover field a female *Colias Edusa*, the only one I have seen this season.—JOSEPH ANDERSON, Jun.; Chichester.

LYCÆNA ARION AND THE LATE SEASON.—It was on June 17th, 1866, that I first saw *Lycæna Arion*. I was then a tyro, and it was my first tolerably good capture. It has, therefore, naturally been a "pet" with me since. For several years I have

given up all active collecting, but every season I have made a few visits to *Arion's* haunts on the Cotswold Hills; and I have taken it more or less sparingly every year. The dates of first capture I have recorded are as follows:—June 17th, 1866; June 20th, 1867; had probably been out some days in these two years: June 5th, 1868; June 13th, 1869; 1870, exact date not kept, but it was early—about the 10th. This was the best year for *Lycænidæ* I remember. One fine evening I found five *L. Arion* at rest within a few inches of each other, and close by were six *L. Agestis* asleep on one stalk of grass. Five of these I boxed straight off into one pill-box. Since 1870 I have kept no regular account of dates, but have found that the 10th to 20th June should be considered as the date due for *Arion*. I have never taken any in July, except old worn specimens. In 1867 and 1868 they have been rather later. This season I have made periodical visits to the ground since June 18th, but the first specimen seen was July 8th. Then came more bad weather, and it was a week before another was seen. This species has continued emerging and in fair condition to the very end of July, but has been unusually scarce. This makes *L. Arion*, which I have always considered a very regular species in its appearance, to be four to five weeks later than in average seasons.—H. W. MARSDEN; Regent Street, Gloucester, August 11, 1879.

CALLIMORPHA HERA.—It may possibly be of some interest to readers of the 'Entomologist' to know that I captured *C. Hera* the year before last at Bonchurch, Isle of Wight. It was a moderately good specimen.—H. ROWLAND-BROWN; West Walton Rectory, Wisbeach, August 10.

PLUSIA ORICHALCEA.—I was at Wotton-under-Edge three days last week, and favoured with tolerably fine weather. I strolled about the old haunts to try and pick up some insects. On the hills the little *Lycæna Alsus* was fairly plentiful, but in so worn a condition that I left them alone; other blues scarce. *Arge Galathea* in great abundance, as also the Common Ringlet (*Satyrus Hyperanthus*). In the woods little was astir in the daytime but a few *Minoa euphorbiata* in the thicker portions, and in the cleared portions *Chelonia plantaginis* rose up every now and then as I went along; and, in following up one of these, what should I see sitting on a plant of *Mercurialis* in front of me but *Plusia*

orichalcea—a fine male, his wings shining in the sun. My net was over it in a moment, and it is now on my setting-board. I beat about all the following day, but could not find a second specimen. This insect was taken in the same place in September, 1858, since which time I have not heard of its being captured.—V. R. PERKINS; 54, Gloucester Street, S.W.

ACRONYCTA ALNI AND PLUSIA ORICHALCEA AT WOODCHESTER.—I took a specimen of *Acronycta alni* in July at rest on a stone wall during the day, and on the 8th of this month my companion, the Rev. H. Reader, took *Plusia orichalcea* at rest on a frond of mountain fern in the morning, and I had the like good fortune, in the afternoon, of finding another perfect specimen at rest, evidently just emerged.—[Rev.] H. S. B. GATES, O.P.; Dominican Priory, Woodchester.

ABUNDANCE OF PYRAMEIS CARDUI AND PLUSIA GAMMA AT BATTLE.—This last week *Pyrameis cardui* has appeared in this neighbourhood in very great abundance. *Plusia gamma*, also, has been unusually plentiful.—THOMAS HOWE; Normanhurst Court, Battle, Sussex, August 17, 1879.

ABUNDANCE OF PYRAMEIS CARDUI AND PLUSIA GAMMA.—Adverse as the weather has been to vegetable and insect life generally, this season there must have been something in it singularly favourable to the development of *P. cardui* and *P. gamma*. The former are swarming here in thousands, and the latter in tens of thousands. With the doubtful exception of gnats on a calm summer evening I have never seen any species of insect so multitudinous.—W. McRAE; Westbourne House, Bournemouth, August 25, 1879.

EXTRAORDINARY ABUNDANCE OF PLUSIA GAMMA.—In the August number of the 'Entomologist' (Entom., xii., 194), Mr. Fitch, in a very instructive article, has given some details respecting certain enemies to our pea crops, which did much injury in the spring of this year. And now another army of depredators has come forth to the attack, for our farmers—at least those of this district—have been ruefully lamenting the havoc committed by immense numbers of the larvæ of *Plusia gamma*, whole fields of peas being well-nigh stripped bare of leaves by them, thus arresting of necessity the subsequent development of the peas in the pods. I collected on the 5th

August a quantity of the larvæ, which were then nearly full-fed. In the course of three or four days they spun their cocoons and turned into pupæ, the perfect insects emerging on the 14th, so that the pupa state lasted but the short time of six or seven days. The thrushes (*Turdus musicus*), which are this year unusually numerous, congregated in the fields in large flocks; doubtless fed sumptuously every day on the larvæ, which they must have considerably diminished. As an instance of the ignorance of many agriculturists on questions connected with Natural History, and their stupid inability to discriminate betwixt their friends and foes, I may mention that, because they found the thrushes at the peas, some attributed the mischief to "them rascally birds," and were for "shooting them all off." The imagines of *Plusia gamma* are now swarming in every direction, and fly from the flowers and hedges more like bees than moths. They are equally abundant by day as by night; anything like this profusion I never remember. I insert this note in order to ascertain if other districts have been similarly affected.—JOSEPH ANDERSON, JUN.; Chichester.

PROFUSION OF *PLUSIA GAMMA*.—The sandhills and neighbourhood of the sea on the Essex coast are this August infested by a multitude of the moths of *Plusia gamma*. So large are the numbers that they almost pass description. It is no uncommon thing to see ten to twenty specimens fighting with one another to get at a single thistle-flower, to the exclusion of all other insects.—JOHN T. CARRINGTON; Royal Aquarium, August 16, 1879.

FLIGHT OF *PLUSIA GAMMA*.—Under date August 13th, a son of mine writes me from St. Leonards that the sea there is scattered over with moths which are being washed up in lines on the shore. The boatmen state that nothing similar has been witnessed previously; but no one seems to have noticed whether the moths have come over from France or have been drowned in attempting to leave England. The specimens sent me are *Plusia gamma*, and I do not learn that any diversity of species has been detected among the multitudes. Moths, I believe, are more rarely known to collect in swarms and to set out on pilgrimage than are butterflies.—J. W. SLATER; Ivy Cottage, Bicester Road, Aylesbury.

PYRAMEIS CARDUI AND *PLUSIA GAMMA*.—If *Pyrameis cardui*

is as generally abundant as it is at the present moment in this district, you will, no doubt, very shortly receive many notifications of it. During the past May and June the number of apparently hybernated examples was unusually large, and the present flight has, without a doubt, been bred from them, for all are now evidently fresh from the chrysalis. Each day the number appears to increase, the first having come out about ten days ago. Many years past (I think somewhere about the year 1850), in the month of September, this butterfly was in great profusion here; since then it has been comparatively scarce. Its abundance now may be imagined from the fact that to-day I observed upwards of a score together on a few thistle-blooms in a lane close by. On the heather (now in full bloom) it is dispersed in every direction. Several often fly up together, with a constant succession of one, two, or three at a time; and now and then quite a concourse in some specially bright or sheltered nook. Even more abundant is (the never very scarce moth) *Plusia gamma*; in fact, it is just now a pest to the collector. In some spots, among flowers much delighted in by this moth, it is no exaggeration to describe it as rising in a swarm. All hopes of capturing a rarity, should there be such among them, is quite at an end amid such a bewildering flight of these restless moths. Whatever bad effect, therefore, the present ungenial season may have had on other Lepidoptera, there has evidently been something especially favourable in it for the two species mentioned.—[Rev.] O. P. CAMBRIDGE; Bloxworth Rectory, August 18, 1879.

PROFUSION OF *PLUSIA GAMMA*, ETC., AT OSTEND.—I have just returned from a short trip to Dover, Margate, and Ramsgate, where the dearth of insects was quite depressing. I was, however, agreeably surprised and very much astonished at witnessing the contrast presented on my arrival at Ostend. I never saw such a sight; to say there were millions of insects might be an exaggeration, but to say there were hundreds of thousands of *Plusia gamma* would not be. These were in shoals everywhere, but principally on a patch of clover near the Kursaal, and at night round the electric light near the casino on the parade. *Pyrameis cardui* was flitting by hundreds up and down the streets, and on the barren sandhills where there is not a stick of anything green, but the great rendezvous seemed to be on a large solitary thistle beside the quay, where the slimy water is so deliciously (?)

perfumed which may have been part of the attraction. On this thistle was a mass, as close as they could pack themselves, of *P. cardui*, *P. gamma*, and several other Noctuæ and Crambites whose names I cannot be certain of. I saw only one *Vanessa polychloros* and a suspicious-looking dark butterfly very like *V. Antiopa*; however, I cannot say for certain, for I took no entomological apparatus with me.—H. RAMSAY COX; Thornleigh, Forest Hill, S.E., August 20, 1879.

BOLETOBIA FULIGINARIA IN THAMES STREET, LONDON.—I have the pleasure to inform you that one of our men has just brought to me a specimen of *Boletobia fuliginaria* which he had taken on our wharf. It is a female, but unfortunately, in getting it into a box, he did a little damage to the right upper wing; in other respects it is perfect in condition. This is the second specimen that has been taken on the same premises, for, in the same place, my friend Mr. Mallett took a male about twenty years ago.—J. R. WELLMAN; 14, Portland Place North, Clapham Road.

EUPITHECIA EXPALLIDATA.—*Eupithecia expallidata* has been unusually abundant here this season. On Thursday last, twelve werè boxed in about half an hour, just before dark. The males were worn, but most of the females were in good condition.—[Rev.] O. P. CAMBRIDGE; Bloxworth Rectory, August 18th, 1879.

SPILODES PALEALIS AT BOX HILL.—Whilst collecting at the above locality on August 10th, I had the pleasure of taking three fine *S. palealis*. I was also fortunate in breeding the yellow form of *Zygæna filipendulæ* from pupæ collected on the Hill.—A. W. PRIEST; 16A, Merton Road, Stanford Road, Kensington, August 18, 1879.

SCOPARIA BASISTRIGALIS, ETC., NEAR DONCASTER.—Whilst collecting with Mr. Wm. Prest, of York, in Edlington Wood, near Doncaster, on Bank Holiday, August 4th, we came on a colony of *Scoparia basistrigalis*. It occurred in great abundance in an area of, perhaps, a hundred yards square, more than a dozen specimens frequently being found on the trunk of a single large tree. We also took fine larvæ of *Notodonta chaonia* crawling up the trunks of the oaks on the same ground. Other species taken by us, and other members of the Yorkshire Naturalists' Union (which had an excursion there that day), either larvæ or imago, included *Thecla W-Album*, *Phorodesma bajularia*,

Ennomos fuscantaria, *Timandra amataria*, *Scotosia vetulata*, *Anticlea rubidata*, *Ebulea crocealis*, *Scoparia cratægalis*, and many others. As showing the extraordinary character of the season, *Abraxas ulmata* was still out commonly, and in good condition; and *Melanthia albicillata* was by no means over.—GEORGE T. PORRITT; Highroyd House, Huddersfield, August 12, 1879.

ACIDALIA HERBARIATA.—A lovely specimen of this curiously-rare species was exhibited at the last meeting of the West London Entomological Society, by Mr. Coverdale. It was found at rest upon a door-post in Cannon Street, in the City of London, on 22nd July last. The specimen is in beautiful condition; in fact, fine as though only just emerged from its pupa.—E. G. MEEK; 56, Brompton Road, S.W., August 10, 1879.

ANTICLEA BERBERATA DOUBLE-BROODED.—Some larvæ which I had, fed up and went into pupæ, and, thinking they would remain so until next spring, I placed the cage in a cold cellar; but on examining them I was surprised to find that the whole of the moths had appeared.—F. O. STANDISH; 8, St. Paul's Terrace, Cheltenham, July 19, 1879.

ABUNDANCE OF EMMELESIA DECOLORATA.—Whilst walking down a lane, near Leyton, leading to Hackney Marshes, the other evening (July 18th), I was surprised at the great abundance of *Emmelesia decolorata*. I had only a few boxes with me, and therefore took about half a dozen specimens, but could, if I had had a net with me, have taken a hundred. Never having heard of this species occurring in such numbers before, I thought it might possibly be of interest to readers of the 'Entomologist.'—A. THURNALL; Stratford, July 21, 1879.

ANCHOCELIS LITURA.—As Mr. E. A. Fitch is in doubt respecting the time for the egg of this species to hatch, I may state that a female specimen taken at ivy blossom last October deposited eggs which hatched early in April. The larvæ did well on whitethorn, but are a considerable time before changing to pupæ, remaining in a torpid state until their transformation.—F. O. STANDISH; 8, St. Paul's Terrace, Cheltenham, July 19, 1879.

NOTES ON THE SEASON NEAR WOODCHESTER.—My experience of this season is that not a single specimen will come to sugar

here, but at light a larger number come than at any time during the last few years. I have recently taken *Iodis vernaria*, *Cucullia lychnitis*, *Notodonta camelina*, *Selenia illustraria*, and *Dianthœcia conspersa*; and such things as *Chelonia caxa*, *Boarmia repandata*, *Bryophila perla*, *Lithosia complanula*, *Liparis salicis*, *L. auriflua*, *Selenia illunaria*, and many of the common Noctuæ, have come absolutely in dozens; but why a *Pieris napi* should be keeping such late hours it would be hard to surmise. Next week I am going to visit some privet in bloom in Woodchester Park, about a mile from here, and there perhaps I may discover the reason of the absence of insects from the sugar.—[Rev.] H. S. B. GATES, O.P.; Dominican Priory, Woodchester.

CAPTURES IN SUTHERLANDSHIRE.—In September and October, 1877, I was for some time at Balblair, in Sutherlandshire, and among the Coleoptera there taken by me was a *Cicindela* in the larval state. I dug it out of its burrow, one of several, in the sandy edge of a moor above the Shin River, from which the moor is separated by the road to the falls. I tried to rear the larva, but failed; so I can only guess it to be that of *C. campestris*. I have it now preserved in spirits. Can any reader tell me if *Cicindela* has been previously, or since, recorded so far north? Among other coleopterous captures was a specimen of *Staphylinus stercorarius*, taken out of a patch of horse-dung which was absolutely heaving with continually changing thousands of *Aphodius contaminatus*. *Dromius quadrimaculatus* occurred at sugar; *Harpalus ruficornis* and *Otiorhynchus sulcatus* under stones; *Lema cyanella*, and what I take to be *Prasocuris aucta*, by sweeping. The Lepidoptera, particularly the Geometers, were very abundant. Among the Diurni *Argynnis Aglaia* was pretty well represented; and the females of little *Lycæna Alexis* were the finest I have ever seen. Being unable to sugar more than twice I took very few Noctuæ, but among the few a fine melanic *Xylophasia polyodon* (at sugar). *Charæas graminis* was very common by day on yellow ragweed; and on September 8th I found two females on grass in the act of oviposition. *Polia chi* was only just coming out, but three specimens were taken resting on the northern side of tree trunks by day. On September 8th and 11th I took on broom a number of the larvæ and one or two pupæ of *Orgyia antiqua*. The larvæ were most of them nearly full-fed; and such as attained the pupa state at all did so in the

course of ten days. The perfect insects began to appear in about eighteen days, and the females at once commenced to deposit their eggs. Is *Antiqua* commonly found on the broom? This plant is not given in Owen Wilson's list of food-plants. Has *Antiqua* been recorded from Sutherlandshire before?—L. DUFF DUNBAR; Ackergill Tower, Wick, N. B., July 8, 1879.

[In the "Insecta Scotica," as published in the 'Scottish Naturalist,' Dr. Buchanan White records *Orgyia antiqua* as a certain inhabitant of his Moray district, and probably of Sutherland. It is exactly the same case with *C. campestris* in Dr. Sharp's list of Coleoptera. Last June I found the latter insect very abundant at Braemar, at an elevation of about 1400 feet. The larva of *O. antiqua* has been found commonly on many of the Scotch moors, generally feeding on the heather, but occasionally on *Vaccinium*. The fact of such a polyphagous larva feeding on broom cannot by any means be considered unprecedented.—E. A. F.]

THE WEATHER, AND ITS EFFECTS ON LEPIDOPTERA.—I can quite corroborate Mr. J. Jenner Weir's interesting note on this subject (Entom. xii. 179). In the district where I at present reside (Hornsey) up to the present time both plants and insects have been unusually retarded in their development by the long-continued winter and cheerless spring and summer through which we have so far passed. I have kept a rough daily record as to the state of the weather and the occurrence of Lepidoptera, and beg to offer from it the following notes. At present a casual visitor would imagine that insect-life was all but extirpated here, for I have only seen the commonest species, and but few specimens of them. If I recollect rightly 1875 was not a forward year at first; but, on the 17th May, the oaks at Lyndhurst were advanced enough to supply food for the larvæ of *Himera pennaria* and other common species which do not hatch till the spring, and which were then over an inch long; and the *Pieridæ* were out before the 12th of May. This year the oaks did not assume a green tint till the 26th of May. I observed the first *Pieris brassicæ* sunning itself on the banks of the cutting through which the Great Northern Railway approaches Hornsey Station, on the 10th of June. I saw the first hawthorn blossom on the 5th of June. Last year, in spite of the early part of the summer being anything but brilliant, I found *Cænonympha Pamphilus*, and

Lycæna Icarus just out and not scarce near Southend on June 18th, and *Satyrus Janira* on the 20th; and on the 23rd *Vanessa Atalanta* and *V. urticæ* were just beginning to emerge from the pupa. This year I have, up to this date, only seen *Pieris brassicæ* and *P. rapæ* or *P. napi* about Hornsey; the largest number I observed being nine on June 13th. An evening's sugaring in one of the Surrey woods, on June 24th (a mild damp evening), produced nothing. The only Lepidoptera seen, excepting a *Noctua* on the wing, not netted, being *Geometræ*, mostly in fine condition, which are usually out before the end of May. From my diary it would appear that since June 1st there have been twenty-one days more or less sunny, only two being really brilliant, and sixteen on which it has rained, seven of which were very wet.—B. LOCKYER; 27, King Street, Covent Garden, July 2, 1879.

THE WEATHER, AND ITS EFFECTS ON LEPIDOPTERA.—In the 'Entomologist' for July (Entom. xii. 179) I observe that Mr. J. Jenner Weir has written upon the above subject, and asks for further notes with reference to the same. In reply to his desire will you allow me to record the dates of three captures I have made in our locality, which tend to prove the late appearance of our March and April Lepidoptera. On May 31st I took a fresh *Tæniocampa cruda*; on June 8th I found on some railings a *Cucullia chamomillæ*; and five days later I caught a *Hemerophila abruptaria* in good condition; while in the middle of May the gas-lamps were frequented by *Hybernia progemmaria*, *Tæniocampa instabilis*, and other contemporary things. Thus we see some of the results of a cold spring upon insect life; but although the summer so far as it has gone has been fully in character with this year's spring weather, yet I must admit that the "sugar" is now producing only such species as we have a right to expect during the month of July.—H. T. DOBSON, jun.; New Malden, Surrey.

PARTHENOGENESIS IN A MOTH.—As previous to this year I was unaware of parthenogenesis among the Lepidoptera, I send you this note, thinking the subject may prove as interesting to others as it is to myself. Last summer I fed up about a dozen larvæ of *Liparis dispar*, three of which I gave to a friend, and they all emerged as males; the first of my own to come out was a male, which I immediately killed. After this I kept three

females, wishing to secure eggs, but as no other male made its appearance I was disappointed, although the moths I was keeping laid batches of eggs, two of which I threw away, thinking, of course, that they were infertile; and the other batch would have shared a like fate had it not been deposited upon the side of a box in which I had other pupæ. Judge of my surprise when, on May 6th, I found that larvæ were emerging therefrom, and these identical larvæ are still feeding. As I kept the pupæ in a securely-fastened box with a glass lid, no male could have had access. I shall be curious to see if this power of reproduction will extend to the next generation.—W. G. PEARCE; Bath.

[Parthenogenesis in the Lepidoptera is by no means infrequent—many species have been recorded as producing second broods without the immediate fertilisation of a male; in the family *Psychidæ* it very frequently happens.—ED.]

PENTODON PUNCTATUS, *Villa.*, IN SPITALFIELDS MARKET.—In the June number of the 'Entomologist' (Entom. xii., 158), I had the pleasure of recording the capture of *Carabus auratus* in the Borough Market. I have again pleasure in recording another interesting capture, and this time of a beetle not indigenous to Britain, Spitalfields Market being the haunt of our new friend: on the 10th June last I had brought to me by a friend, who is a salesman in the market, a fine specimen of the above-named insect; it was found by him sauntering leisurely over a sieve of cherries, although I do not suppose it was revelling in the luxury of the fruit. I need scarcely say the cherries were Continental, having been sent from the South of France. I can find no record of this insect having been taken in Britain before, so I thought this capture might interest many of your entomological readers. It probably does to many seem strange that such insects as *Carabus auratus* and *Pentodon punctatus* should occur in our London markets; but my little experience leads me to think that if entomologists generally were to make friends amongst the many salesmen in the markets, we should not unfrequently have records of many interesting captures, and probably, occasionally, some few varieties; for instance, *Pentodon punctatus*, which is a native of the South of Europe.—T. R. BILLUPS; 4, Swiss Villas, Coplestone Road, Peckham, August 14, 1879.

GOOSEBERRY AND CURRANT BUSHES ATTACKED BY LARVÆ.—Many of the gooseberry and currant bushes in this neighbourhood have this year been almost stripped of their foliage by immense numbers of those little pests, the larvæ of *Nematus Ribesii*. A short time ago I had a box of these larvæ brought to me, which I fed up, and this day (July 12th) several of these sawflies have emerged. Can any entomologist suggest any means whereby we may withstand their attacks should they assail us in the future?—R. LADDIMAN; Norwich, July 5, 1879.

INJURIOUS INSECTS.—The whole of the gooseberry and currant bushes in this neighbourhood are entirely denuded of leaves by the larvæ of a sawfly; they are here in countless thousands; the bushes are dreadful objects, not a vestige of green left on them, but plenty of fruit. Other pests are abundant, but partial; but the gooseberry grubs are everywhere.—V. R. PERKINS; The Brands, Wotton-under-Edge, August 8, 1879.

PARASITES OF THE CELERY FLY.—At folio 141 of his 'British Entomology' Curtis says of *Alysia Apii*:—"For specimens of this insect and their history I am indebted to a lady who found the larvæ feeding upon the parenchyma of celery leaves the 30th September; on the 11th October they had changed to shining oval pupæ of a dull ochre colour, having very much the appearance of a shell (*Turbo Chrysalis* of Turton); the imago appeared the June following." Amongst the addenda to this fine work he, however, expresses a doubt whether the shell-like pupæ did not belong to a *Tephritis*, and that the *Alysia* was its parasite; subsequently the matter was so, correctly, stated in his paper in the 'Journal of the Royal Agricultural Society' (vol. ix., p. 192, August, 1848), and again in 'Farm Insects.' There he goes further, for speaking of the beautiful and peculiar Chalcid, *Pachylarthrus smaragdinus*, Curt., he says:—"Whether the *Pachylarthrus* is a direct parasite, and punctures the larva of the *Tephritis*, or lays its eggs in the pupæ already occupied by the *Alysia*, which in all probability is the case, has not been ascertained." This spring, in breeding this pretty fly (*Tephritis onopordinis*), whose larvæ were so destructive to our celery crops last year, I have met with several specimens of *Pachylarthrus smaragdinus*. This insect is excellently figured on Plate 427 of 'Brit. Ent.' under the name of *Phagonia smaragdina*.

It is a beautiful green Chalcid, with the anterior joint of the maxillary palpi extraordinarily developed in the male; and this, like the antennæ and legs, being bright orange in colour, is especially noticeable. Not having met with a single *Alysia*, and on opening the pupæ finding no trace of the ichneumon occupant, I think Curtis's surmise cannot be established, and have but little doubt that the *Pachylarthrus* is a direct parasite of the *Tephritis*. In no case was there more than one parasite in a pupa.—EDWARD A. FITCH; Maldon, Essex.

OBITUARY.

SIR THOMAS MONCREIFFE, Bart.—It is with much regret that we record the death of Sir Thomas Moncreiffe, which took place on August 16th, after a short illness, the cause of death being exhaustion ensuing upon a very painful operation. The deceased was in his 57th year. A keen sportsman and an accurate observer of Nature, it is only about ten years since Sir Thomas turned his attention to Entomology. In this branch of science he chiefly confined himself to the Lepidoptera of Perthshire, to the study of which he devoted all the time not necessarily occupied by his private and public duties. Though his field of observation was in great measure confined to Perthshire, Sir Thomas was no mere collector, but a scientific entomologist of broad views, and those who had the pleasure of being associated with him, either personally or by correspondence, know what a keen eye he possessed for the distinction between species, and how enthusiastic he was in the study of the habits of his favourites. He was a frequent contributor to the pages of the 'Scottish Naturalist,' amongst his last communications being a list of the Lepidoptera he had observed on Moncreiffe Hill, including upwards of six hundred species, and many of great interest and value as throwing light upon the geographical distribution of the species. Sir Thomas was president of the Perthshire Society of Natural Science for several years, and did much to promote the study of Natural History in Perthshire. With all classes he was extremely popular, while his genial and kindly nature endeared him to everyone who knew him.—F. B. W.

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LOCALITIES FOR BEGINNERS.

No. IV.—LOUGHTON.

By JOHN T. CARRINGTON.

HAD it not been for the agitation commenced in this magazine by the East London Entomologists, which gradually spread to others interested in Epping Forest, the Corporation of London would not have now been owners and trustees, for the public, of Epping Forest. The manor of Loughton forms a considerable portion of what now remains of the Forest. This district has always been a favourite one for the London entomologists; and no wonder, for within easy reach of the Londoner are many hundred acres of woods, forming a fine collecting ground for insects, with a large variety of species, especially of Lepidoptera.

The majority of Epping Forest is on the London Clay, which near High Beech reaches its greatest altitude. But here and there are large patches of the lower Bagshot sands. High Beech stands on one of these patches, which there extends from a little north of the King's Oak Inn to south of the new church.

There are two convenient ways of reaching the Loughton portion of Epping Forest. The first is by rail from Liverpool Street or Fenchurch Street Station to Loughton Station, a return day-ticket costing only a shilling. The second route is by railway also from Liverpool Street Station to Chingford. In each case the journey occupies about forty-five minutes.

Loughton Station is close to the Forest. Strolling past the Crown Hotel, nearly opposite we see Snakes Lane, leading into the Forest. Arrived there, those who visit this part of Essex, for the first time, cannot fail to be struck with the curious appearance of the trees. Years upon years of "lopping and topping," one of the hardly contested rights of certain commoners, have caused

them to grow rather into thick bushes upon tree trunks than into the wide-spreading shady trees of other counties. I often hear my entomological friends complain of the practice of lopping, but although it adds nothing to the beauty of the scene, I think it very convenient for the collector. He can the more easily beat for larvæ or imagines, for in most instances the highest branches are within reach. This kind of growth may also to some extent account for the very extensive insect fauna of Loughton. These trees consist of beech (*Fagus sylvatica*), of hornbeam (*Carpinus betulus*), which are in decided majority; still there are many other species, such as oak (*Quercus robur*), birch (*Betula alba*), and alder (*Alnus glutinosa*). Amongst the undergrowth are scrubby examples of most of the foregoing, with honeysuckle (*Lonicera*), various willows, and salallows (*Salix*). Plenty of heather (*Calluna vulgaris*), dwarf whin (*Genista anglica*), &c.

Arrived within the Forest by way of Snakes Lane, we leave the road and bear along a little path to the right, shortly crossing a new road now being cleared. From this point we see below us a valley with a little stream at the bottom, which is a small tributary of the River Roding. Keeping up this stream brings us to a piece of nice flat marshy ground. This is Debden Slade, and is well known to the older collectors. At sugar on the trees by the side of this little patch *Noctua rhomboidea* occurs in some seasons quite commonly. Many rare Lepidoptera have been taken just in this neighbourhood, which should be tried at all times of the year. On the sloping bank to the south may be found in their respective seasons larvæ and imagines of *Limacodes asellus*, sometimes even abundantly. This bank is also the head-quarters, and I believe the only known locality, for *Stigmonota leguminana*, generally to be taken as a unit in a day's collecting, although odd lucky catches have been made by those who have carefully studied its habits. *Stigmonota Weirana* is also here, as well as in other parts of the Forest, amongst beech, and *S. puncticostana* should be sought for; all of them species much wanted in collections, and well worth taking. If the micro-lepidopterist wishes for a treat he may have one in May and early June in capturing the lovely little *Stigmonota internana*, which is to be seen flitting over the furze (*Ulex europæus*) bushes and in the sunshine looking like little snow-flakes. The white

underwings give them the snowy appearance that readily separates them from the very abundant *Catoptria ulicetana*, which flies over the same bushes not only then, but during the whole summer. *Chrosis Audoinana* is here also in June, and is always a prize.

Following this valley will bring us to the High Beech Road, close to the Robin Hood Inn. Here are four roads meeting. We can turn to the right, which takes us towards the Wake Arms Inn. On both sides are many sallow bushes, where in olden times Mr. Doubleday used to get the purple emperor (*Apatura Iris*) flying over them, but it is now many years since one was seen. About half-way up this road we scramble up the high bank to the right, and a short walk brings us to Little and Great Monk Woods. In these the whole scene changes, and we are amongst the unlopped portion of the Forest. The trees stand in striking contrast to their stunted neighbours, and in hot weather afford a delicious retreat from the other and less-shaded parts of the Forest. *L. asellus* is often common amongst the beeches here, while *Ephyra trilinearia* is in abundance. As I have just stated, I think lopping is in the collector's favour, for, excepting these two species, little else occurs in sufficient quantity to keep us long amongst these tall trees unless it is to pick up an odd *Stauropus fagi* resting on a beech tree trunk, or in July *Liparis monacha* setting in the same manner on the oaks.

Returning by the way we came brings us back to the road, which we cross, and work in the opposite direction. Following on we come to the King's Oak, High Beech. If this is in June we should especially search the marshy hollow behind the Inn, for amongst the scrub beneath the trees was first found *Erastria venustula*, for long so rare, but which has latterly been more frequently taken here and in other parts of the Forest by beating the low bushes and by looking for it at dusk when its short flight occurs. This hollow is apparently its head-quarters, where the larva is said to feed on cinquefoil (*Potentilla tormentilla*).

While refreshing ourselves at the King's Oak Inn we have, on a fine day, one of the finest views in the London district. From one side of the house one may see far away over Hertfordshire, past the tall chimneys of the celebrated gun-factory at Enfield. On the other side the vista closes with the Kentish Hills beyond Gravesend, the fine breadth of undulating

woods intervening. Crossing the road opposite the Inn, we walk over a lawn of fine grass down to a little hollow. Here occurs *Lycæna Algon* and *Procris statices*: a series of each may soon be taken. On the beech trees near here, feeding on the hard fungus so often found on the decayed parts, will be seen the traces of the larvæ of *Scardia chorargella*.

Working our way past the new church we come down, after a long stroll, to Fairmead Bottom, another nice marshy bit of meadow surrounded by trees, but much more extensive than the Debden Slade. Here, as well as in other parts of the Forest, in early spring is to be found at night, resting on the flowers of blackthorn (*Prunus communis*), the imagines of *Aleucis pictaria*. At the westerly end of this little marsh we come out at Leppitt's Lane, a few yards up which is the Owl Inn, where Mr. Lane, the proprietor, has always a hearty welcome for the entomologist, and will tell him how, during many a long season, he has ministered to the comfort of the weary flycatchers who have more than once been in such numbers as to sorely tax his resources. Returning to the Fairmead we should look for *Macroglossa fuciformis* and *Crambus pinetellus* in June, the former flying like a humble bee in the sunshine. *Corycia temerata*, *Lithosia aureola*, and *Numeria pulveraria* are also there. During the whole season something or other will turn up to reward the diligent collector about Fairmead Bottom. Working away southwards we come to Queen Elizabeth's Lodge: originally used as a hunting lodge, but now a refreshment-house. In this latter stroll we again come upon some more fine uncropped trees, where, for some reason, lopping has not been practised. From here to Chingford Railway Station is but a few minutes' walk.

The very pleasant walk of some three miles I have just described, extending from Loughton to Chingford, is only one of many which may be taken in this portion of Epping Forest,—where at all times of the entomological season there is much to be done by the lepidopterist. Now that the autumn months have commenced, and October and November are approaching, there is a very ample field for the student amongst the larvæ of the leaf-mining *Tineina*. At another page of this number of the 'Entomologist' will be found an interesting account by Mr. Elisha of his experience in forcing *Tineina* during the winter months, thus saving much valuable time when the insects would naturally

appear, and many others occupy our attention. The genera *Lithocolletis* and *Nepticula* are especially amenable to forcing.

Amongst the many autumnal larvæ which may be taken at Loughton are *Stauropus fagi*, which has not been uncommon this season; *Notodonta chaonia* and *N. dodonæa*, from oak; *Demas coryli*, from beech; *Eurymene dolabraria*, also from oak; while beech and hornbeam produce *Limacoides asellus* and *Ephyra trilinearia*, the latter in abundance. In May the curious larva of *Phorodesma bajularia* is found on oak, looking more like a caddis-fly case than that of a decent lepidopteron, being dressed in ragged bits of sticks and leaves. The imago flies at the end of June a little before dusk, but always high. A good plan is to throw up a sod of grass when one is seen, and it will often come down sufficiently low to be reached with the net.

Amongst Diurni, as I have already said, *Apatura Iris* used to be taken. *Thecla betule* and *T. quercus* are frequent, as are *Argynnis Paphia* and *A. Adippe*, while many others are common, especially *Lycæna Argiolus*, wherever hollies occur.

The second known example of the very rare *Sophronia emortualis* was taken by Mr. Charles Healy behind the King's Oak at High Beech. Another great rarity since taken at Loughton was *Eupithecia egenaria*, the example being now in the collection of Dr. Battershell Gill. There is no saying that these may not some day be again found, for was not *Erastria venustula* a lost species for many years? It does not follow because a collector has for seasons visited a locality that he knows all about it. In fact, that very feeling is a source of danger to the entomologist, and makes him careless and so miss many a good species.

Loughton has been worked by entomologists for many years, probably longer and better than any other district in England; but he would be a brave man who would say there is nothing new to be taken in those pleasant woods.

I have to thank Mr. E. G. Meek for showing me, with his usual kindness, the localities of the more local Lepidoptera at Loughton, and telling me of many others.

Royal Aquarium, Westminster, S.W., September, 1879.

A WINTER OCCUPATION FOR LEPIDOPTERISTS.

By GEORGE ELISHA.

As the time is now approaching for collecting the various species of the leaf-mining genera, *Lithocolletis* and *Nepticula*, in the larval state, viz., October and November, perhaps a short description of a forcing apparatus I successfully tried during the early part of this year may be useful and new to some of the readers of the 'Entomologist.' It is a great advantage to be able to breed these minute insects at a time of year when there is scarcely anything else to be done entomologically, and to get them all out, well set, and in the cabinet some weeks before the natural time of their appearance. In the month of May, when species begin crowding upon us, it is almost impossible to spare the necessary time to set these species in any quantity, and as carefully as they should be. The consequence is, they are apt to become neglected, and possibly cause the collector to give up studying the *Tineina*—that most interesting portion of the Lepidoptera.

My apparatus consists simply of a box, ten inches square and six inches deep, open at the top and lined with thin zinc. A zinc tray is made to fit the top, one inch and a half deep, to contain damp sand. Underneath on the tray is soldered a much smaller tray, an inch deep, which forms the boiler; a short piece of pipe is soldered in the upper tray, through which to fill the boiler. The tray is then put on the box,—the edges being made larger prevents its falling through,—and underneath is placed a spirit lamp, or jet of gas, the flame being barely a quarter of an inch long, which is quite sufficient to give a great and regular heat. A square hole is cut in the side of the box in front, to put the hand through to regulate the light, and on the opposite side, just underneath the tray, a few holes are drilled in the box for ventilation, or the light will go out. Above the tray, and resting on the damp sand, is a square zinc glazed case, eight inches high; the top square of glass is loose to lift out, for placing the bottles or glass jars in containing the pupæ, and also to regulate the heat. When all is ready, fill the boiler nearly to the top with water. Then fill the trap with damp sand to give a moist atmosphere, and put on the glazed case. After which, put in the jars containing the leaves mined by the larvæ, and in the

centre suspend a small thermometer, and light the gas or lamp, which can be regulated with ease to keep the heat up to between 60 and 70 degrees Fahr. It is then no further trouble, and will well repay anyone for the little time spent in getting it in order.

During last February and March I bred without any difficulty a long series of the following *Lithocolletidæ* in fine condition, and some of them unusually large specimens, viz.:—*L. spinicolella*, *L. faginella*, *L. corylella*, *L. salicicolella*, *L. carpinicolella*, *L. tenella*, *L. ulmifoliella*, *L. tristrigella*, *L. emberizæpennella*, *L. Nicelliella*, *L. Schreberella*, *L. lantanella*, &c. The last-named insect being a hybernating larva, I had a doubt about it, so tried a few; but found in about five days they had changed to the pupa state, and in the following week the imagos appeared. I think a great deal might be done with small hybernating larvæ among the *Tineina*, generally so very difficult to rear successfully. I also bred *Cosmopteryx Lienigiella* and *C. Drurella*; also many species of *Nepticulidæ* quite three months before their usual time. Ample amusement and instruction may be obtained during the dull season by thus breeding most of the *Tineina* that appear in May, and leave one at liberty in that busy month to look after other species.

Shepherdess Walk, City Road, N.

THE TORTRICES OF SURREY, KENT, AND SUSSEX.

By WALTER P. WESTON.

(Continued from p. 188.)

Peronea sponsana, Fab. = *favillaceana*, Hub.—Generally distributed, but not very abundant; the larvæ may be found in July and August in rolled-up leaves of birch, beech, and sallow. The imago appears in the autumn, and may easily be obtained in the day-time by beating; it also comes to light and sugar, and is a frequent visitor to ivy-bloom.

P. autumnana, Hub. = *rufana*, Schiff.—Mr. Stainton gives Wimbledon Common, Surrey, as a locality for this species, but, as far as I am aware, it has not occurred there of late years; possibly the alterations, draining, &c., which have taken place on the common have had something to do with its disappearance. It is a late autumn species, and on one or two occasions has been

taken tolerably plentifully by fumigating. The larva feeds on *Salix fusca*, the dwarf sallow, poplar (*Populus*), *Myrica Gale*, &c. It has also occurred in Kent,—at Birch Wood and near Dover. Notwithstanding the opinions of several entomologists to the contrary, I am inclined to believe that *P. Lipsiana* is only a northern variety or local form of this insect, and hope very shortly the life-history of the two species—for so they must be at present considered—will be completely elucidated.

P. mixtana, Hub.—This species may be looked for on moors and heathy places. The imago appears in September and October, and is more often met with in the spring, after hybernation. In places where the heather is tall, and can easily be worked, fumigating should also be attempted for this insect. It has occurred at Wimbledon and Shirley Heath (Surrey); in Sussex, at Lewes, and a single specimen is mentioned in the Rev. E. N. Bloomfield's list of Hastings and neighbourhood. In Kent it is sure to be met with on the moorland to the west of Tunbridge Wells.

P. comparana, Hub.—Generally distributed.

P. Schalleriana, Linn.—Generally distributed. I have met with this insect very abundantly some seasons near Folkestone, and a few of the variety *Latifasciana*, Haw., have been taken in the same locality. It appears scarce at Hastings, but it will probably be found when worked for.

P. Caledoniana, Bent. MS.—Occurs not uncommonly in the north of Kent, but is a scarce and local species in the South of England.

P. permutana, Dup.—Formerly used to occur commonly in Surrey, on Barnes Common, among *Rosa spinosissima* in August and September, but I am not aware of any recent captures, and fear it is no longer to be met with in its old haunts; indeed I have been informed that its food-plant is getting very scarce, and there is some fear of *Rosa spinosissima* following the example of other botanical rarities on the Common, and disappearing altogether.

P. variegana, Schiff.—Common everywhere.

P. cristana, Fab.—Scarce and local. The imago appears from August till November, and hibernated specimens are occasionally met with in the spring. The larva feeds in rolled-up leaves of hawthorn, usually preferring old and mossy trees.

A few years ago I took some numbers in Folkestone Warren, including a few of the variety *Subcapucina*, but have not met with it there lately. It also occurs at Birch, Darenth, Greenhithe Coombe, and West Wickham Woods. I know of no Sussex locality.

P. Hastiana, Linn.—Far more common than the preceding species, and generally distributed; the larva feeds in the terminal shoots of various species of sallow in July and August, the imago appearing in September and October. Wilkinson says a second brood appears in May, but these are probably only hybernated specimens from the autumn brood.

P. umbrana, Hub.—This is another insect that we appear to have lost sight of lately. It appears confined to Surrey and Sussex, the localities given being Sanderstead and Mickleham, and a single specimen recorded by Mr. Verrall from the neighbourhood of Lewes. The moth should be looked for in September and October, and occurs chiefly among blackthorn and whitethorn.

P. ferrugana, Treit.—Distributed throughout, occurring commonly among birch and hornbeam. The imago, which varies greatly in its colour and markings, appears from July till November, and is also common in the spring, after hybernation, when the specimens are generally in good condition.

P. tristana, Hub.—Not uncommon where its food-plant, *Viburnum Lantana*, grows, and is more readily bred than captured. The larva is full-fed in August, the moth appearing in September and following months. In Kent it has occurred at Darenth, Greenhithe and Birch Woods; at Pashley, Lewes, and Hastings, in Sussex; and in Surrey at Wimbledon, Mickleham, Sanderstead, and Croydon.

P. aspersana, Hub.—Common on all chalky downs wherever its food-plants, *Spiræa filipendula* (dropwort) and *Poterium sanguisorba* (lesser burnet) occur.

Teras caudana, Fabr.—Widely distributed throughout during the autumn months, and sometimes commonly. At Folkestone I once met with this insect in unusual abundance and in every variety of colour from dusty to nearly black. The varieties *ochracea*, *emargana*, and *excavana*, described by Wilkinson, were tolerably common, as was also another having the ground colour of the fore wings dark red with markings indistinct, and of a dark brown colour.

T. contaminana, Hub.—Abundant everywhere.

Dictyopteryx Læflingiana, Linn.—Abundant everywhere.

D. Holmiana, Linn.—Abundant in all hawthorn hedges.

D. Bergmanniana, Linn.—Abundant among rose-bushes.

D. Forskaleana, Linn.—Common everywhere among maple.

Argyrotoza Conwayana, Fab.—Distributed throughout, and not uncommon among privet bushes and hedges.

(To be continued.)

ECONOMIC ENTOMOLOGY.

By STEPHEN FITZWILLIAM.

(Concluded from p. 201.)

BELGIUM also has found the need of legislation to compel the destruction of insects. Rewards were formerly given, but it has been found requisite to resort to compulsion. I have not the Belgian code at hand to refer to, but I believe it is left to an *arrête royale* to direct from time to time the measures to be taken.

In considering the results of experiences of other nations, and comparing compulsory action with action for rewards, it will not be forgotten that, eleven years ago, the Central Agricultural Society of Saxony made efforts to secure united action among landowners, and urged the magistrates to assist in getting the insects collected. The influence of the society was sufficiently great to secure large numbers being destroyed. This, however, seems to have been a result to be regarded as an exception rather than a rule, and the united action was the more readily obtained since the year was an exceptionally bad one as to damage from cockchaffers.

America, too, has found the need of legislation in some States,* instead of relying on bounties only. There the ravages are on so gigantic a scale, and inventions and arrangements for destroying locusts are kept so prominently before the public, that it might be readily imagined that the need for voluntary united

* The laws are given in full in the report of the State Entomologist for Missouri, 1877, and in the report of the United States Entomological Commission. The French laws I referred to at greater length because the information is not so accessible, as a fire at the office destroyed nearly all the copies of the 'Journal Officiel,' from which I have quoted.

action would have been recognised. But experience has shown compulsion is requisite.

While France, perhaps more than any other country, has sought to spread a knowledge of practical Entomology through its schools in agricultural districts, America has, more than any any other country, taken the very practical step of appointing a Commission to collect data on insect ravages. England, even with its vast agricultural interests at stake, alone seems indifferent and inactive. Switzerland, Belgium, and Germany do more than we do. France, through its *Société centrale d'Apiculture*, has encouraged the study of Economic Entomology in its elementary schools to an extent that would astonish many an experienced English school inspector. The *société* gives prizes for the best drawings, on enlarged scale, of familiar farm and garden insects. In some cases, these are from the pupils' own dissections; in others they are but copies. No doubt the specimens of drawings, which are exhibited from time to time, are the pick of the work, just as our Science and Art Department shows only the pick of the work of the young art students. Granting this, it still proves France is in advance of England with regard to the spread of a study of Economic Entomology.

The example set by America in collecting information is well worth consideration. A Commission was appointed, and funds were voted; and the energetic way in which the Commission set about its work was worthy of the trust committed to it.

The Commission, consisting of three skilled entomologists, was authorized by Act of Congress (approved March 3rd, 1877) to report upon the depredations of the Rocky Mountain locusts in the Western States and Territories, and the best practicable method of preventing their recurrence or guarding against their invasion; and was attached to the United States Geological and Geographical Survey of the Territories under charge of Dr. F. V. Hayden.

The Commissioners at once began their work upon receiving their appointments.

Several thousand circulars asking for information were sent to persons in the locust areas, and two bulletins in pamphlet form were issued; one containing full information regarding the preventive measures and direct remedies then known against the young locusts, for immediate use by farmers; the second

containing an account of the habits of the locust, so far as then known, with numerous illustrations. The circulars were readily responded to.

The field work was so subdivided as best to promote the end in view. It was carried on from early in April until the early part of November. Every assistance seems to have been gratuitously offered by the officials of the different States, the Post-office, and the railways. The report, of 477 pages, and of 294 closely-printed pages of appendices, shows what an energetic small Commission can do in one seven months in the way of collecting data.

In bringing my remarks to a close I would summarize what seems to me to be the present want in England on the subject of insect-damage:—

- 1st. We want statistics as to what is our annual national loss by insect damage.
- 2nd. We have to decide from these whether it is sufficiently important to demand a united action to deal with it, as has been found requisite in the countries to which I have alluded.
- 3rd. If united action is required, we have to consider whether a society is competent to deal with the subject, or whether it needs Government action.
- 4th. If a society is competent to deal with it, we have to find a society that will take the matter up or to originate one.
- 5th. If it is decided that Government action is needed, there should be drawn up a scheme to submit for consideration.

As I said at the outset I am not an entomologist, but I am glad of this opportunity of endeavouring to draw out the present feeling of those who appeared to be supporting the efforts which Mr. Murray was making.

[I regret that want of opportunity has prevented my learning about the work originated in Exeter by the Misses Ormerod.]

APHIDES.*

By EDWARD A. FITCH.

It was Latreille who divided the Hemiptera into the two sub-orders Heteroptera and Homoptera. The latter includes the Froghoppers (*Cicadidæ*), the cuckoo-spit hoppers (*Cercopidæ*), the ticklers (*Thripidæ*), the leaf-hoppers (*Psyllidæ*), the bark-lice (*Coccidæ*), and the plant-lice (*Aphididæ*).

According to Packard, the homopterous Hemiptera stand the higher in rank, "as the body is more cephalized, the parts of the body more specialized, and in the *Aphidæ*, which top the series, we have a greater sexual differentiation, the females being both sexual and asexual, the latter by a budding process and without the interposition of the male producing immense numbers of young, which feed in colonies." ('Guide to the Study of Insects,' 6th edition, p. 518.)

Aphides, popularly known as plant-lice or smother-flies, abound everywhere and in almost every situation, from the roots of grasses to the topmost leaves of forest trees. There are few to whom they are not known, vulgarly if not scientifically. As Mr. Buckton observes, "Some species of *Aphis* are hardy enough to thrive on the stony heaths of Scotland and Northumberland, whilst others will live almost in the reach of the spray of the sea-shore." I can go further, for I have found *Aphis asteris*, Wlk., living 150 yards away from land on the Essex saltings, which are covered by the tide every day for about eight hours out of the twenty-four. These plant-lice are to be found on every part of the plant; some species affect the roots, others the trunks or twigs of trees and the stems of plants, others the leaves, while some only attack the flower-stalks or flowers, and a few, as the grain *Aphis*, the fruit. There are some few botanical families which are apparently exempt from their attack. Buckton mentions the *Fumariaceæ*, the *Gentianæ*, and the *Irideæ*. Aquatic plants even are not spared, for our beautiful water-lily (*Nymphæa alba*) is often in certain years almost completely annihilated by the attacks of *Rhopalosiphum nymphææ*, and certain other water-plants are commonly infested by other species. Of the very

* Monograph of the British *Aphides*, by George Bowdler Buckton, F.R.S., F.L.S., F.C.S., &c. London: Printed for the Ray Society. Vol. I., 1876. Vol. II., 1879.

numerous leaf species it is remarkable that the walnut-inhabiting *Callipterus juglandicola*, which has occurred so sparingly this year, and the reed-feeding *Hyalopterus arundinis* are the only species known to feed from the upper surface of the leaf.

The effect of *Aphis* attack is often curious and most interesting. Some species cause well-marked galls, as the pine-apple-like fir galls of *Chermes abietis*, the elm-leaf galls produced by *Tetraneura ulmi*, *Schizoneura ulmi*, and *S. lanuginosa*, the poplar leaf-stalk gall of *Pemphigus bursarius*; mugwort leaves are galled by *Cryptosiphum artemisiæ* and stitchwort leaves by *Brachycolus stellariæ*. Other species mass together, blister, curl, or otherwise distort the parts attacked in very peculiar fashions, these are numerous, but the curling of our currant-leaves by *Rhopalosiphum ribis* and of our peach and nectarine-leaves by *Aphis amygdali* will serve as familiar examples. The mere mention of such species as the green dolphin or pea-louse (*Siphonophora pisi*), the black dolphin or collier (*Aphis rumicis*), the hop fly (*Phorodon humuli*), the grain or wheat *Aphis* (*Siphonophora granaria*), the apple louse (*Aphis mali*), or the apple-tree louse or American blight (*Schizoneura lanigera*), the green-fly of our greenhouses, or the vine *Phylloxera* (*Phylloxera vastatrix*), is sufficient at once to suggest to the reader what have at times been the effect of a grand attack. The flavour of *Siphonophora lactucæ*, Kalt. (not *Rhopalosiphum lactucæ*, Kalt.) is probably well known to all salad-eaters.

This short sketch calls to mind how worthy our neglected plant-lice are of more extended study than they have yet received; in this country more especially, whether we work from a scientific or a practical standpoint. Leuwenhoek, Réaumur, Bonnet, and De Geer, all gave much attention to these insects. Linné described 33 species in the 'Systema Naturæ,' and since his time, Schrank, Hausmann, Burmeister, Hartig, Kaltenbach, Ratzeburg, and Koch have studied them in Germany; Léon Dufour, Signoret, Balbiani, and Lichtenstein in France; Morren in Belgium; Passerini in Italy; Zetterstedt in Sweden; and Fitch, Shiner, Riley, and others in America; whilst our own country has produced Samouelle, Curtis, Walker, Newport, and Huxley as labourers towards gathering in the abundant harvest of *Aphis* history.

Mr. Buckton now epitomizes these stores of varied information,

and gives us an elaborate 'Monograph of the British Aphides.' The talented author specially declares that it is neither exhaustive nor complete; but be that as it may, its publication, thanks to the Ray Society, gives the entomologists of this country such a basis on which to build, that we hope *Aphis* study will attract more workers than has hitherto been the case.

The observant Shakspeare tells us that it is the imagination of the poet which gives to airy nothing

"A local habitation, and a name."

The omnipresent plant-lice have been treated in a similar way at the hands of various entomological writers; this also in a greatly aggravated form; for probably there is no group in the whole animal kingdom which has suffered more from the assignment of local habitations and names, with very little or no regard to specific differences, than the *Aphididæ*. It became almost an axiom with naturalists that each species of plant had its own peculiar *Aphis*, hence names were inordinately multiplied and the various food-plants of particular species were utterly confused. While this state of things lasted, progress in life-history knowledge was impossible. This obstacle has now been removed, but not until one species of *Aphis* (*Aphis rumicis*, L. = *fabæ*, Curt.) has become possessed of no less than thirty synonyms, and one name (*quercus*, *persicæ*, *salicis*, &c.) given by different authors represents five or six distinct species. When we are assured by Walker that the often-destructive species, which appears in Mr. Buckton's monograph under Schrank's name of *Rhopalosiphum dianthi* feeds on at least sixty known plants, we can easily foresee the difficulties engendered by the application of the old monophagous principle.

The very numerous and very beautiful and accurately-coloured plates which illustrate Mr. Buckton's volumes will guard against this old-established error; the correct determination of a species with these at hand should not be difficult. The first volume contains forty-five plates, the second fifty, and another volume is promised to complete the work. Another great difficulty attending *Aphis* study has been the preservation of specimens, and here again the plates will be most useful. They serve for a typical collection in themselves, more especially when accompanied with microscopic preparations of the winged forms. An improved system of preservation has been lately introduced, similar to that

used in the preservation of lepidopterous and other larvæ, namely, inflation by hot air. It must be stated, however, that the distinctive specific characters of *Aphides* are by no means sharply marked; their size, form, and colour so quickly change according to their degree of maturity, and they are so easily affected by the manner of living, viz., by the ever-changing meteorological or climatal conditions, or by the natural seasonal changes, by variation of food plant, and other surrounding circumstances.

"The cause of this interest may be traced without difficulty to two principal facts. In the first place, the study of these creatures has presented to the embryologist questions for solution of the greatest importance. Phenomena connected with processes of reproduction occur, which, even now, some physiologists consider to be abnormal, and concerning the interpretation of which unqualified consent is by no means accorded. In the second place, the general naturalist has found much to engage his earnest attention, whether he regards the varied life-history of the different species of *Aphides*, their curious habitations, the injuries they inflict on vegetation, or the defences they make against the host of insect foes which attack them on all sides,—attacks which keep within limits an extraordinary fecundity, which otherwise might bring famine into the districts they infest."

So says Mr. Buckton, and the life-history and metamorphosis of an *Aphis* is indeed extraordinary. Even now, these questions of reproduction, the extreme rarity of the males, the distinction of the perfect sexes, oviparism and viviparism, parthenogenesis and metagenesis, their migrations and extraordinary swarms, are far from being satisfactorily settled. The biology of so exceptional a group must be both interesting and instructive to all who are disposed to follow it out. I had intended to have given a sketch of "the cycle of the compound individual," but this article is already long; still before bringing it to a close, the various and beneficent *Aphis* destroyers must be referred to.

These natural limiters act in two ways, from without and from within. The devourers from without are the larvæ of the dipterous *Syrphidæ* (hovering flies), the neuropterous *Hemerobiidæ* (golden-eye or lace-wing flies), and the coleopterous *Coccinellidæ* (ladybirds); these larvæ, happily for vegetation, are all particularly voracious and particularly common. The larvæ of certain *Scymni* also feed upon *Aphides*, and Mr. J. W. Slater has recently proved

the aphidivorous character of the coleopterous *Telephoridae* (Entom. xi. 163, 255). In one of the late Mr. F. Walker's numerous notes on *Aphides* we read, "The comfrey *Aphis* is the frequent prey of a little red dipterous larva, which seldom attacks other species." (Entom. vi. 27); this was doubtless the larva of the little gall-gnat, *Diplosis aphidimyza*, Rondani. Dr. F. Löw found it preying on the *Aphides* inhabiting seven different plants, so it by no means confines its attacks to one species. We now come to the Hymenoptera; their influence on *Aphis* increase is particularly powerful. Various fossorial *Crabronidae* store up insects of different orders in their cells as food for their future progeny, these being paralyzed and not killed by the stings of the parent bees; species of the genera *Crabro*, *Stigmus*, *Diodontus*, *Passalæcus*, *Pemphredon*, *Cemonus*, and *Psen* are known to provision their cells with plant-lice, and there are probably others. Marshall's 'Catalogue of the British *Oxyura*' includes 373 species distributed amongst 83 genera; but of their economy we know next to nothing. It is not improbable that many are aphidivorous.

Of the limiters from within—the true parasites—all are hymenopterous, and comprise species of the *Cynipidae*, the *Ichneumonidae*, and the *Chalcididae*. The numerous species of the genus *Allotria* (*Cynipidae*) complete their metamorphoses within the bodies of the various *Aphides*; they stand at the head of all the internal parasites, being very closely related to the true gall-flies. The species comprising the genera *Toxares* (*Trionyx*), *Ephedrus*, *Monoctonus*, *Praon*, *Aphidius*, *Lysiphlebus*, *Diæretus*, and *Trioxys*, forming the Braconid group *Aphidiides* of the *Ichneumonidae*, are all parasites in the bodies of various plant-lice; some of the species, more especially of *Aphidius*, are at times particularly abundant, as instanced by the numerous pierced inflated *Aphis*-skins, which are such obvious evidence of previous parasite occupancy. Coming to the *Chalcididae*, the enumeration of the *Aphis*-frequenting genera would be wearisome; suffice it to say they are numerous, though as yet but little understood. The economy of insects is truly wonderful; here we have the plant limited by an *Aphis*, this is preyed upon by an *Aphidius*, which in turn serves to nourish an *Asaphes*, a *Chrysolampus*, or not improbably one of the *Ceraphronidae* (*Oxyura*). These, of course, are the cultivators' enemies, being parasitic in a degree too far

advanced for *Aphis* limitation. Conjecturally the chain might be lengthened still further by supposing the *Myinidæ*, which are frequently bred from *Aphides*, to be parasitic on one of the above-mentioned Chalcids. This treble-linked parasitism is clearly foreshadowed, for, on plate 64, Mr. Buckton figures a cocoon of *Coryna* (= *Chrysolampus*) containing five small pupæ of its parasite (fig. 4). However, parasitism to the second degree is sufficiently involved for present study, and more especially here, where we introduce the collateral parasites of the various external natural protectors, which are also numerous.

The relation of *Aphides* to ants, many species of which keep them captive like herds of cattle; the secretion of honey-dew; the individual appearance and habits, whether lethargic or active, in which the species greatly vary, and other interesting points, have not been touched upon. Enough still has been said, I hope, to stimulate some further enquiries into the manners and customs of these insects which have now found so excellent an historian.

Maldon, Essex, August, 1879.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

UNUSUAL FOOD FOR THE LARVA OF *CHÆROCAMPA PORCELLUS*.—While searching for the larvæ of *Cidaria silaceata* on the *Epilobium angustifolium* (willow herb), I was surprised to take a fine full-grown larva of *C. porcellus* off a stem of the same plant, the leaves of which it had nearly devoured, as well as those of other stems.—F. O. STANDISH; 8, St. Paul's Terrace, Cheltenham, September 9, 1879.

[At page 94 of Kaltenbach's 'Pflanzen-feinde' we read: "This larva may be found from July to September on bedstraw (*Galium verum*), willow-herb (*Epilobium hirsutum* and *angustifolium*), loose-strife (*Lythrum Salicaria*), and vine (*Vitis vinifera*)."—E. A. F.]

DICRANURA BICUSPIS LARVÆ.—On Saturday last I had the pleasure of taking a single larva of this insect on alder. It was hardly earned, for, having a pole twelve feet in length to thrash the boughs with, the work was hard. My impression is that the larva feeds very high up the trees. The larva taken on Saturday is nearly full grown. I got a male specimen of the perfect insect

in the first week in July, at rest on the trunk of the same tree.—J. B. HODGKINSON; Preston, September 15, 1879.

LYCÆNA CORYDON AT LEWES.—*L. Corydon* is now common on the Downs here—fully a month later than the average date.—J. H. A. JENNER; Lewes, September 15, 1879.

STERRHA SACRARIA NEAR ASHFORD.—As we were carrying peas from the field on the 1st instant, a small moth rose from a pea-wad which I was in the act of moving, and immediately settled again. Observing that it had a peculiar habit of letting its wings down far below the stem on which it was sitting, so as to form a very steep “roof,” I obtained a pill-box and secured it. Next day I handed over the box to my friend, Mr. W. R. Jeffery, who pronounced the insect to be *S. sacraria*. It proved to be a female, and in the box were found several eggs, so I hope we may hear something of the progeny at a future occasion.—THOMAS H. HART; Kingsnorth, Ashford, Kent, September 19, 1879.

STERRHA SACRARIA.—Whilst walking across the meadows lying in the valley between Buckhurst Hill and Chigwell, during the afternoon of August 17th, I disturbed a specimen of *S. sacraria* from the grass. As I am not aware of any record of the occurrence of the moth in this part of Essex, perhaps it may be worth while to make a note of the fact. It is a male, and considerably damaged; not having any insect-catching gear with me, I carried it home in a cigar-light box, and possibly did not add to its beauty in so doing. A careful investigation the next day in the above-named fields failed to disclose another specimen.—B. G. COLE; Buckhurst Hill, Essex, September, 1879.

ACRONYCTA ALNI.—I enclose you a sketch of a larva of *Acronycta alni*, taken from lime (*Tilia*) this season by Mr. Chappell, of Manchester.—H. A. AULD; Bank of England, Manchester, September 16, 1879.

ACRONYCTA ALNI.—I accompanied Mr. Hind, of this city, with one of his sons to Sandburn last evening. His son had the good fortune to take a fine larva of *Acronycta alni* feeding on mountain ash, close to the tree upon which Mr. Birks took one at sugar many years ago.—W. PREST; 13, Holgate Road, York.

NONAGRIA BREVILINEA AT MONK'S WOOD.—I captured a very

fair specimen of *Nonagria brevilinea* flying over reeds in Monk's Wood, when sugaring there on the night of July 18th. The specimen was identified by T. G. Styan, Esq., B.A., of Trinity College, and also by Mr. Brown, of Cambridge. As far as I have heard, this is the first specimen of *Brevilinea* taken in the above locality.—A. E. HUNTER; Jesus College, Cambridge, August 29, 1879.

LEPIDOPTERA TAKEN IN 1879.—At the end of June I collected 3650 pupæ of *Abraxas grossulariata* from a garden in the neighbourhood of Manchester. The imagines appeared on 1st July, and the number which emerged kept increasing each day. On the 11th, 180 appeared: I then discontinued collecting. About one hundred varieties are now set out, so that I think it may be inferred that species as often as not are much liable to vary, even after having fed in their wild state. Fresh specimens of *Chortobius Davus* were flying on Chat Moss on 12th July. On the 19th, at Lyndhurst, in the New Forest, *Aplecta herbida* was just over, the banded variety of *Boarmia repandata* had been taken freely at sugar, together with *Calligenia miniata*, *Thyatira derasa*, *T. batis*, *Acronycta tridens*, *Leucania turca*, *Noctua brunnea*, *N. festiva*, *Euplexia lucipara*, *Aplecta nebulosa*, and a number of other common things. I remained in the Forest until the 28th. During the first few days *Zygæna meliloti* was fresh, and I captured a confluent variety. *Boarmia roboraria* was just over, one specimen taken being rather worn. For several days I noticed that both *Limenitis Sibylla* and *Aryynnis Paphia* were scarce, but the 28th being a bright and favourable day, they were abundant, fresh from the pupa. There were, however, very few female *A. Paphia* on the wing, yet my companions took a beautiful specimen of the var. *Valezina*. I first made my acquaintance with the Forest about ten years ago, when *Catocala sponsa* was so plentiful that I knocked them off the sugar. Since that memorable year until the present I had not noticed many of the several species which are periodically abundant there. *Lithosia quadra* sometimes turns up in plenty, but this year might almost be chronicled as the "Quadra year." I have had the pleasure of collecting a number of the larvæ of that insect, and brought away with me 2000 of them, but regret to find that they are uncommonly cannibalistic, for each I succeeded in rearing must have eaten at least six of its

fellows before assuming the pupal form. I might easily have taken ten times the number of *L. quadra*, but considered those collected sufficient for myself and friends. On August 2nd, at Lindo Common, near Stockport, *Hyria auroraria*, *Crambus margaritellus*, and *C. Warringtonellus* were flying and in good condition. On the 9th, near Chat Moss, I found *Cucullia chamomillæ* feeding on the flowers of the devil's daisy, and exposed to the mid-day sun. The markings of the larvæ bear a striking resemblance to the calyx of the flower upon which they rest. At Cleethorpes, in Lincolnshire, on August 23rd, *Nonagria Elymi* was worn, *Agrotis præcox* just out, and the larvæ of *Chærocampa porcellus* and *Macroglossa stellatarum* were plentiful upon the bedstraw growing on the sandbanks along the shore. *Agrotis valligera* was to be taken at the flowers of the sea-holly. *Pyrameis cardui* and *Plusia gamma* were in profusion. On the 30th, at Greenfield, in Yorkshire, *Charæas graminis*, *Heliphobus popularis*, *Larentia cæsiata*, and one *Penthina sauciana* were in good condition. On September 6th, in Sherwood Forest, *Noctua glareosa*, *Amphipyra pyramidea*, *Cymatophora diluta*, and *Euperia fulvago* were about the only insects at sugar except *Noctua xanthographa*. *E. fulvago* came freely to sugar, after rain and when the ground was moist, but not more than five or six specimens could be seen when the ground was dry. On September 13th, *Hydræcia nictitans*, *Celæna Haworthii*, and slightly-worn specimens of *Carsia imbutata* were flying on Chat Moss and some good larvæ yielded to the beating-stick. During the day I took a number of the following:—*Smerinthus ocellatus*, *S. populi*, *Dicranura vinula*, *Notodonta dictæa*, *N. dictæoides*, *Platypteryx lacertula*, *P. falcula*, *N. camolina*, *Saturnia carpinii*, and *Acronycta leporina*, full fed with the exception of *N. dictæa* and a few *D. vinula*, which were only half-size. So far I have found the present a tolerably good season, but several of the species enumerated were late in appearance. It will doubtless be interesting to have the experience of others on the subject.—HENRY A. AULD; Blackheath.

CAPTURES ON THE LINCOLNSHIRE COAST.—With the exception of a little about Cleethorpes, hardly anything seems to be known of the Lepidoptera of the Lincolnshire coast; consequently, the results of a short expedition to Skegness, in company with Mr. C. W. Richardson, of Wakefield, dating from July 16th to

28th last, may be worth placing on record. The whole of the Lincolnshire coast is of singularly uniform character, and by no means inviting to an entomologist, being either mudflats or sandhills throughout its entire course. Sandhills prevail at Skegness. Inland it is still more dreary, there being hardly anything but bare meadows, with few trees, and the hedges are stunted and dry. Our collecting was confined to the sandhills. Perhaps the most interesting species taken was *Eupithecia innotata*, of which I boxed two specimens off marram grass, &c. The imago is very like *E. fraxinata* in shape and markings, but is bigger, though the larva, judging from a figure which Mr. Crewe has very kindly let me see (drawn from a Continental specimen), is evidently very different. *Nonagria Elymi* was very abundant; this species, formerly so rare in collections, evidently occurs all along the coast from Yorkshire, at Spurn, right away to Norfolk. At first we were rather at a loss to account for the occurrence in plenty of several insects usually considered marsh or fen species; such as *Nudaria senex*, which abounded on the sandhills; and *Herminia cribralis* also was common enough. We afterwards found that however hot and dry the day was, the sandhills, and particularly the hollows, were excessively damp in the evening; indeed we were soaked through every night we went out, even in the finest weather. This, with the presence of several marsh plants, of course was sufficient to account for the insects. At dusk we generally sugared the posts, and I never saw Noctuæ come more freely; but for the quantity, never, I think, did I see so common a lot. The species taken in various ways, omitting those already mentioned, and those of almost universal distribution, were *Chærocampa elpenor*, *Lithosia complanula*, *Hemithea thymiaria*, *Acidalia scutulata*, *A. interjectaria* and *A. imitaria*, *Timandra amataria*, *Eupithecia centaureata*, *Melanthia ocellata*, *Pelurga comitata*, *Leucania comma*, *Axylia putris*, *Xylophasias sublustris*, *Mamestra abjecta*, *M. anceps*, and *M. albicolon*, *Miana literosa*, *M. fasciuncula*, and *M. arcuosa*, *Caradrina Morpheus* and *C. blanda*, *Noctua plecta*, *N. C-nigrum*, and *N. rubi*, *Aplecta occulta* (one fine female specimen), *Hadena pisi*, *Scoparia lineolalis*, *Crambus perllellus* and *C. Warringtonellus*, *Anerastia lotella*, *Homœosoma nimbella*, and *Pterophorus pterodactylus*: this last was flying in hundreds, and we had frequently half a dozen in the net at once.—GEORGE T. PORRITT; Highroyd House, Huddersfield, September 10, 1879.

LEUCANIA STRAMINEA NEAR STAINES.—I took a specimen of what I take to be *Leucania straminea* at Laleham Ferry, on the south side of the river, last Saturday. Laleham Ferry is about two miles from Staines. I saw no others about. Is this a new locality for this moth? Newman only mentions one in his 'British Moths.'—G. E. M. SKUES; 21, Burton Crescent, W.C., August 14, 1878.

[There are several localities for *L. straminea* in the London district.—ED.]

MOTHS CAUGHT IN THE BLOOMS OF THE BURDOCK.—I have on several occasions found moths caught by the hooks with which the scales of the involucre of the burdock (*Arctium tormentosum*) are armed. The moths were in all the instances quite dead, firmly hooked, and in some cases pierced on each side of the thorax underneath the wings. Sometimes the wings are more or less damaged in the struggles of the moth to escape; at other times the moth has been quite perfect, and with all the appearance of a living insect sitting on the flower, until, being touched, its condition was seen at once. In one instance the semblance of life was so complete that I was in the act of trying to box it off the flower before I perceived its real state; in this case the moth was *Lithosia stramineola*.—[Rev.] O. P. CAMBRIDGE; Bloxworth Rectory, September 3, 1879.

TORTRIX DUMETANA.—In his notes on the Tortrices of Surrey, Kent, and Sussex (Entom. xii. 218), Mr. W. P. Weston says this species occurs in "oak woods" near Lewes. I have never known of any locality in an oak wood about here. I find the species in some number every year along the hedges on the chalk, where oak is quite absent. I have an idea that the species feeds there on *Clematis vitalba*.—J. H. A. JENNER; Lewes, September 15, 1879.

THE LATE SEASON.—The results of my observations this year as to the time of appearance of various insects accords very much with those obtained by other collectors. For example, the ova of *Tæniocampa opima* hatched in 1878 on May 4th, in 1879 on May 18th; and those of *Liparis dispar* in 1878 on April 23rd, in 1879 on May 21st. This year I took the larvæ of *Orthosia ypsilon* on June 28th; last year I took the larvæ as early as May 7th, and had imagos out on June 27th. This year I found

larvæ of *Diloba caruleocephala*, about half-grown, on June 27th; last year I took them full-fed on May 23rd. This year I saw a full-fed larva of *Odonestis potatoria* near Farnham on July 16th, while last year the imago was out in Staffordshire on Midsummer-day. And once more, *Dicranura vinula* emerged from pupa in 1878 on May 11th, while in 1879 it, too, put in an appearance only on June 24th. The *Tæniocampæ* turned up at the shallows about the same time in both years, the difference (if any) being slightly in favour of the present year, as I find my first captures registered this year on April 1st, while last year I got nothing till the 11th of the same month.—[Rev.] CHARLES F. THORNEWILL; Burton-on-Trent, August 21, 1879.

COLOURED PAPER FOR CABINET DRAWERS.—I noticed last summer, in a collection of butterflies on the Continent, that the families of *Papilio*, *Leucophasia*, *Pieris*, *Anthocharis*, *Gonepteryx*, and *Colias* were in a case lined with black paper instead of white; it had a very striking effect, and served to show the markings extremely well. I daresay this is nothing new, but you may think it deserving of notice.—J. H. LEECH; Park Villa, Wraxall, Isle of Wight.

HAGGERSTON ENTOMOLOGICAL SOCIETY.—September 14th, 1879, was an important day in the annals of this society, being the twenty-first anniversary of its institution. It was therefore arranged to commemorate its majority by holding a dinner at the High Beech Hotel, Epping Forest,—chosen chiefly from its being the house usually frequented by the members while on their collecting excursions in the Loughton neighbourhood. The morning of the 14th was anything but inviting; heavy clouds followed a night of continuous rain; but forty-one members assembled at Loughton Station, and were rewarded for their energy by one of the finest days even an entomologist could desire. Separating on entering the Forest, they met again at the High Beech Hotel, and, under the presidency of Mr. Anderson, the President of the Society, enjoyed the very ample repast provided by the host. No regular collecting was done, but many larvæ were found, some rare ones amongst them, such as six *Stauropus fagi*. It was altogether a very successful day, and a pleasant reunion of many old friends.—J. T. C.

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[No. 198.

TRYPETA RETICULATA.

By EDWARD A. FITCH, F.L.S.



TRYPETA RETICULATA.

OF the numerous and very pretty gall-making *Trypetidæ* but few species are known as British. This is probably owing to their being overlooked more than to their actual absence; the galls or pseudo-galls are in most cases only the deformed ovaries or flower-heads of various *Compositæ*; hence the insect-inhabited heads are not readily noticeable. A familiar exception to this usual flower-head inhabitancy is the beautiful *Urophora cardui*, L., whose galls are large many-chambered (1 to 8) swellings of the stems of the universally common creeping thistle (*Carduus arvensis*). Our other gall-making species is still further removed from the general habits of the genus, as *T. guttularis*, Meigen, was bred from galls at the top or collar of the roots of *Achillea millefolium* (Proc. Ent. Soc. Lond., 2nd ser., vol. iii., p. 43).

To this meagre list of gall-making *Trypetidæ* I added, in 1872, *Urophora solstitialis*, L., which deforms the ovary of the common knapweed (*Centaurea nigra*) into a hard, woody, but only tactilely noticeable, gall (Entom. vi., 142). Now, thanks to the perseverance of Mr. F. Enoch, the gall-making *T. reticulata*, Schrank. (= *pupillata*, Fallen., Meig., Macq., Zetterst.), is proved to be a British species. The pretty *Trypeta continua*, Meig. (= *Spilographa alternata*, Fallen.), which so often deforms the

hips of various roses (*Rosa spp.*) cannot be classed as a gall-maker.

In Walker's Monograph of the British Tephritides (Ent. Mag. iii., 57—85), thirty-three species are described, and a plate illustrates their wing-markings. In Walker's Diptera (Insecta Britannica) sixty-one species are included. *T. reticulata*, Schrk. (= *pupillata*, Fallen.), occurs in neither of these works. The figure above will at once serve to recognise this beautiful species, which is included in the subgenus *Carphotricha*, as also is *T. guttularis*. The wing has been already figured by Dr. H. Loew in Germar's 'Zeitschrift für die Entomologie' (vol v., pl. ii., fig. 53), where two excellent plates of wing-markings, illustrating seventy species, accompanies his monograph of the eighty European species of the genus *Trypeta*, as restricted by Meigen. Dr. Loew's later and larger work, 'Die Europäischen Bohrfliegen,' which is illustrated with twenty-six photographic plates, I have not seen.

Mr. Enock gave me a pair of the imagos of *T. reticulata* last May, and shortly after sent me some of the galled flower-heads of *Hieracium*, similar to those from which they were bred. From these I succeeded in rearing one male and three females of the *Trypeta*, and several specimens of a parasitic *Pteromalus* (probably Förster's *P. Trypetæ*).

The plant from which Mr. Enock's galls were collected has been determined, on good authority, to be either *Hieracium umbellatum* or *H. sabaudum*; from the absence of stem leaves it is almost impossible to say which. The gall-maker, however, doubtless affects several of these closely allied and puzzling *Compositæ*. It is also very probably generally distributed, though hitherto overlooked. In Prof. J. W. H. Trail's "Galls and their Makers in Dee" (Trans. Nat. Hist. Soc. Aberdeen, 1878, p. 66), we read:—" *Hieracium boreale*, Fries. B. The gall, like that in *Hypochaeris radicata*, is a swollen ovary, oval, one-sixth by one-twelfth to one-eighth of an inch, blunt at the ends, surface with four blunt longitudinal ridges, between which are less distinct ridges, hairy; walls hard and woody, enclosing a cell inhabited by a larva of *Trypeta*. Two occurred in a flower-head gathered at Banchory in August; the affected flower-head was not altered externally." This description clearly refers to the galls of *T. reticulata*.

The addition of other species to the British list is foreshadowed. Dr. Trail has described the galled flower-heads of *Hypochæris radicata* (Scot. Nat. iv., 16, and Trans. Nat. Hist., Aberdeen, 1878, p. 65), which were found at the end of July on the Old Aberdeen Links, but were very scarce. Mr. F. Walker gave the name of *Tephritis signata*, Meig., to the species reared by Mr. Moncreaff, of Southsea, "on September 14th, from galls in the receptacle of *Inula crithmoides*; the receptacle becomes thickened and enlarged, and has a hard woody texture. About seven cells in one flower-head. The larva forms a cocoon." (Entom. v., 450). This determination must be wrong, for the larva of Meigen's *T. signata* is the well-known cherry and honeysuckle-berry feeder. According to Loew *T. signata*, Meigen and Walker, is the *Musca cerasi* of Linné. Mr. Müller exhibited some insect galls on tansy (*Tanacetum vulgare*) to the Entomological Society of London, the larva in which showed the gall-maker "to belong to the Diptera, though not a *Cecidomyia*." (Proc. Ent. Soc., Lond., 1870, p. v.) I have two tansy galls now growing in my garden here, probably similar to Mr. Müller's, so hope to know more of the maker in time; it is well to mention this gall here, though I do not fancy the maker will turn out to be a *Trypeta*. The gall on *Crepis paludosa*, exhibited at the Aquarium Exhibition by Mr. T. R. Billups, is not dipterous; it is most likely a variety of *Aulax' Hieracii*. Curtis bred several *Trypetidæ*, but the only true gall-maker he seems to have recorded is the *T. guttularis* bred by Mr. Graham.

Maldon, Essex, September, 1879.

LOCALITIES FOR BEGINNERS.

No. V.—WICKHAM.

By JOHN T. CARRINGTON.

THE best way to reach West Wickham woods from London is by train from any of the South-Eastern termini to Woodside Station. There are frequent trains on week-days and several on Sundays, the return fare being one shilling and threepence.

On leaving the station we turn to the right past the Croydon racecourse, and follow on to a guide-post. Should our first visit for the season be in spring, we might, as we come along the road

thus far, have a beat at the nettles (*Urtica dioica*), and so obtain a batch of larvæ of *Plusia chrysitis* and *P. iota*, both occurring commonly there in some seasons. Continuing on we come to a nice dry bank on the left, upon which grows hawkweed (*Hieracium*), mouse-ear (*Cerastium*), groundsell and ragwort (*Senecio*), and many other low plants. On these we are pretty well sure to find the larvæ of *Chelonia villica*, and perhaps several other species. This bank would well repay a few hours spent in examining it for larvæ by lamp-light on a mild spring night. Having passed this locality we continue on to Shirley Church, when we turn to the left. On our right hand will be seen a fine old oak close fence, which surrounds the park belonging to the Archbishop of Canterbury. This has been long known as the Bishop's Palings, and on them many a rarity has been taken at rest in the daytime. It was here that lepidopterists used to come long ago to find the then prized *Notodonta carmelita*, which may still be found there. In the spring *Cymatophora flavicornis*, *Xylocampa lithoriza*, and *Larentia multistrigaria* may be found on these palings, with possibly *Notodonta trepida*, or even greater rarities, and, during the summer, many Tortrices and Tineina.

Overhanging this fence are some pines (*Pinus sylvestris*). These should be beaten for the larvæ of *Ellopiæ fasciaria*, *Thera firmata*, and *T. variata*; all occurring after hybernation, and readily reared when taken in spring. At the same time imagines of *C. flavicornis*, *Trachea piniperda*, and *Selenia illustraria* frequently fall into the umbrella or net when beating for those larvæ.

On the left-hand side of this road is an open fence and several black gates,—to the entomologist very black, for they form a barrier between him and the fine collecting ground on the other side. Only a few years ago it used to be open to the collector; but now it is closed, with unpleasant notices, and not over civil people to see that these notices are enforced. One cannot help moralising upon this state of things. It seems to suggest one of two things; either a want of liberality on the part of otherwise liberal-minded landowners, who little know how much real pleasure they could give to the students of botany and entomology by granting them permission to roam, as of old, over their preserves; or it suggests that the plant-gatherers or flycatchers have been at some serious mischief, which has caused

this hindrance to their wanderings. I can scarcely believe this is so, or at least hope they have not, for it would indeed be to the entomologist killing the goose with the golden eggs if wanton damage were done where permission is given to collect and admire Nature's beauties. I never had the misfortune to collect with anyone who did such mischief, and I do not think I can remember amongst my entomological acquaintances one who would permit it to be done. Ought we not in return for such permission to protect the property of those who grant the privileges?

Failing an entrance we can work at the wych elms (*Ulmus montana*). From the boughs of these, in May, we may expect to beat larvæ of *Thecla W-album*, and, later in the season, *Abraxas ulmata*. Some ten or twelve years ago *Vanessa C-album* used to occur about here, but it does not appear to have been seen later than that.

Further along this road,—say a mile and a quarter from Shirley Church,—we come to the keeper's house, where there are two paths; that to the left is a private one leading to the Heathy Field. Providing we keep to the path I believe we may collect here, which has probably always been one of the best localities in the neighbourhood. In their season we get from the birch (*Betula alba*) the larvæ of *Notodonta dictæoides*, *N. carmelita*, *N. dromedarius*, *Platypteryx falcula*, *P. lacertula*, *Acronycta leporina*, *Cymatophora fluctuosa*, *C. duplaris*, *Cidaria psittacata*, *Selenia illustraria*, and *S. illunaria*. From oak, in a like manner, *Limacodes testudo*, *Notodonta chaonia*, *N. dodonæa*, *N. trepida*, *Cymatophora ridens*, and *Boarmia consortaria*, with many other species from both trees.

The Heathy Field has always been a favourite corner for both Macro- and Micro-lepidopterists. In 1854 Mr. Stainton, in his charming little book, 'The Entomologists' Companion,' recommends his readers to this corner, where he used to take several rare Micros. It is covered with ling (*Calluna vulgaris*) with one or two *Ericas* intermixed. On the ling may be got, in autumn, larvæ of *Eupithecia nanata*, &c., and, in spring, those of *Agrotis agathina*, *A. porphyrea*, *Noctua neglecta*, *Scodiona belgiaria*, and others. These are best sought for, or swept, at night. *Agrotis agathina* is usually a most difficult species to rear, and, so far as I know, I cannot suggest any good plan. Heather bloom is one of the nicest baits for Noctuæ, and I am

sure one of the nicest to work. At it I have taken many really good species. Sometimes, if we can select a sheltered patch in full bloom, especially if under the shade of some fir trees, we may almost surely make a good bag just after dusk. It is then and there we may expect to find fine large females of *Agrotis agathina*, such as one of my correspondents used to write for to many of my friends, as well as to me, year after year. With these may also be taken *Noctua neglecta* in all the rosininess of fresh birth; while hid away amongst the flowers are one or two suspicious-looking members of the genus *Agrotis*, perhaps *A. nigricans*, *A. tritici*, *A. aquilina*, or an odd *A. obelisca*. These will provide an interesting study for the beginner to separate into species.

Retracing our steps from this strictly-forbidden ground towards the keeper's house we must remember how a lucky collector, while walking here, once beat a larva of *Acronycta alni* and one of *Stauropus fagi* into his net with one stroke of his beating-stick, and, more remarkable still, he bred both on one day the next season. They are now preserved in the club collection of the Haggerston Entomological Society.

Having passed the keeper's we enter a broad path leading to West Wickham village. On each side are pine woods,—again *Pinus sylvestris*. In early spring many pleasant hours have been spent here, when no insects could be seen, in watching the gambols of the squirrels amongst the boughs of these firs. Passing on we come to a low copse of mixed trees, such as birch, hazel, oak, wild cherry, willow, and black poplar. It was here on a certain 29th of May, some years ago, Messrs. A. Harper and J. Smith captured at sugar during a heavy storm an example of the rare *Ophiodes lunaris*. Another rarity has occurred here, and has turned up more than once in the same place, viz. *Madopa salicalis*.

In this copse a very pleasant evening may be spent on a fine night in April, or even March, at the willow bloom. We may get *Hoplorhina croceago*, *Trachea piniperda*, and most of the *Tenio-campidæ*, with *Scopelosoma satellitia*, *Cerastis vaccinii*, *C. spadicea*, and an odd *Xylina rhizolita*. On the same evening by searching the twigs of the birches and other low trees, by the aid of lamp-light, we find the larvæ of *Aplecta tineta*, *Triphaena fimbria*, *T. interjecta*, *T. janthina*, *Noctua baja*, *N. brunnea*, *N. triangulum*, *N. festiva*, and many others. When we arrive in the afternoon,

before commencing, if the sun be still visible, we may take *Brephos parthenias*.

We now make our way past the "Cricketers" inn, at Addington, where the entomologist is soon recognised and made welcome. On the way we should look with the lantern along the palings for larvæ of *Cleora lichenaria*, which is usually abundant on the archbishop's fence, from the corner of the wood at the bottom of the hill to the "Cricketers."

Several good Tortrices have been taken at West Wickham by beating the undergrowth of shrubs when opportunity offers. Amongst these I may mention *Phoxopteryx upupana* and *Eriopsela quadrana*, whilst we may expect to get *Phlæodes demarniana*, *Grapholita Paykulliana*, *G. obtusana*, *Phoxopteryx diminutana*, *Penthina capræana*, and hosts of others.

The soil of West Wickham is gravel, sand, and gravelly loam, with a subsoil of chalk. The flora of the district is extensive and varied.

I have again to thank Mr. E. G. Meek for many kind hints for this article.

Royal Aquarium, Westminster, S.W., October, 1879.

ERRATUM.—In the Loughton article in the last number, pp. 233, 234, read "Smart's Lane" instead of "Snakes Lane."—J. T. C.

EUPÆCILIA GILVICOMANA, Zell.: A TORTRIX NEW TO BRITAIN.

By E. G. MEEK.

I RECENTLY received from Mr. F. O. Standish, of Cheltenham, a series of an *Eupæcilia* under the name of *Argyrolepis Schreibersiana*. The moment I opened the box I found his mistake, and also that it was a species new to the list of Lepidoptera of Great Britain. Under the name of *A. Schreibersiana* Mr. Standish had also recorded its capture at page 205 (*ante*) of this volume of the 'Entomologist.' I packed up some examples and sent them to Dr. Staudinger for identification, not having anything in my European collection of Tortrices with which to reconcile the species.

A day or two following, Dr. Staudinger, being in London,

called upon me. He then saw the series, and agreed with me it was not *A. Schreibersiana*. On his return to Dresden he compared the specimens sent, with others in his collection, and pronounces them to be the *Eupæcilia Gilvicomana* of Professor Zeller, and the *E. flaviscapulana* of Dr. Herrich-Schäffer, the former having priority of nomenclature.

This new and handsome addition to the British list of Lepidoptera is most nearly allied to our *E. curvistrigana*. In our cabinets it should be placed between that species and *E. angustana*.

56, Brompton Road, S.W., Oct. 9, 1879.

[This species occurs near Frankfurt-on-the-Main, but is rather scarce; it flies about the middle of August. The larva lives there, according to A. Schmid, on the flowers of the golden-rod (*Solidago Virgaurea*), around which plant the moths are also captured in Silesia. According to Von Heinemann the larva feeds on *Chenopodium*; and Mühlig bred this species from larvæ which he found in July feeding on the blooms of the wall-lettuce (*Prenanthes muralis*).—KALTENBACH'S 'PFLANZENFEINDE.']

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of DR. S. C. SNELLEN VAN VOLLenhoVEN,

By J. W. MAY.

(Continued from p. 175.)

PHYLLOTOMA TENELLA, Zaddl.

See Zaddach, *Beschreib. neuer oder wenig bekannter Blattwespen* (1859), p. 28, Pl. fig. 17.

Phyllotoma æneo-nigra, flavo-maculata, abdominis lateribus albo-maculatis, pedibus albis, basi nigris. Long. 4 ad 5 mm.

It is owing to the kindness of Mr. P. Cameron, jun., of Glasgow, that I am enabled to give the life-history of this species. I take this opportunity of thanking him sincerely for his good offices. I first received from Mr. Cameron some imagos, and subsequently several leaves with some larvæ and a pupa. That the present species is indigenous (in the Netherlands) was shown in the first instance by the larva having been found in this country,—it was observed by Mr. Snellen on

the birch,—and in the second place by a discovery of Mr. C. Ritsema, who found the perfect insect, in the month of May, at Ginneken, sitting on a small birch tree. Mr. Ritsema captured the insect, which was a female.

The Scotch entomologist above named communicated to me the following particulars respecting the life-history of this insect :—

The egg is always laid at the tip or on the edge of a birch leaf, never in the middle of the leaf, and, as a rule, only one egg is laid on a leaf; sometimes two eggs may be found, and even, once in a way, three. On emerging from the egg the larva begins forming a broad mine in the leaf, and the upper surface above the mine immediately becomes black or dark brown. The space between the surfaces of the leaf is regularly enlarged, so that, by the time the larva has attained its full size, about three-fourths of the whole upper surface has been undermined. The little animal is very careful always to keep its habitation clean, and for this purpose makes an opening at the edge of the leaf, through which its excreta are ejected. In the mine the larva lies on its back, feeds in this position, and rests after feeding at the spot where it has last mined. When full grown the larva spins within the leaf a thin brown cocoon of a circular shape and semitransparent; this cocoon is so roomy that the larva can easily move itself in all directions.

There are two broods in the year; the first occurs in June, July, and August; the second from the end of August through September and the rest of the year into the following spring, when the larva changes to a pupa. The spring pupa then remains a fortnight or three weeks in the cocoon before the imago makes its appearance.

The young larva (August) is dull brownish yellow, and has a broad green longitudinal line on the back after the fourth segment. At this stage the head is brown at the sides, yellow in the middle, and has projecting brown jaws. On the middle of the first segment of the body are two brown triangular spots, and on each of the following two segments are two fine transverse lines. At the sides the segments project strongly in the middle. (See fig. 2).

The full-grown larva is deep or pale yellow (the individuals differ in colour); the first three segments, which form the

thorax, are always much broader than the others. Cameron writes to me that this is more especially the case in young examples; but this is contrary to my observation, which was, however, confined to a single young specimen. In the paler-coloured larvæ traces of a green dorsal vessel can be perceived through the skin. I conclude that the deep yellow larvæ are somewhat older than the paler individuals. The sutures of the head are marked out with brown; the jaws and the antennæ are also generally pale brown (figs. 3 and 4). The thoracic legs are blunt, conical processes, and consist of two joints, the latter of which is very small and nipple-shaped, and without any trace of a claw (fig. 5); the middle legs are thick and very blunt (fig. 6), and the last pair is reduced to an oval blunt, wart-like prominence, having two brown oblong spots underneath (fig. 7). I was not able to count the middle legs.

Before changing to a pupa the larva lies in the cocoon in a curved position, like the larvæ of the weevils, as represented at fig. 8 (the head is shown at fig. 9). It may here be remarked that figs. 8 and 9 were drawn at the end of March, and fig. 4 in the autumn; this may in some measure account for the difference in colour. I am unable to say positively when fig. 3 was drawn, but I think in September.

The pupa (fig. 10) shows very clearly the different divisions of the body, and gradually assumes the colouring of the perfect insect.

Fig. 11 represents the imago, a female; it is small and rather broad. The head is unusually broad, and connected to the prothorax by a narrow neck; the eyes are very projecting. The general tint of the body is a somewhat metallic-black. The head has two broad lines along the inner margin of the eyes, a spot between the antennæ in the form of a horseshoe, the clypeus, the upper lip, the mandibles, the cheeks, and the palpi, white or yellowish white. The antennæ, consisting of ten joints (see fig. 12), are brown, and are somewhat thickened towards the apex; the first two joints are black bordered with white. The posterior margin of the prothorax and the tegulæ are yellowish white; the cenchri are greyish brown. The opening in the dorsum between the first and second segments of the abdomen is rather large, and on the bordered margin of each segment is a bluish white oval spot (fig. 13). The sheaths of the ovipositor are shining

black, with reddish brown curved hairs at the apex; the ovipositor itself is pale brown (fig. 14). The legs are white, with a slight tinge of brown; the base of the coxæ and the larger part of the femora are shining black: there is also a fine black line on the inner side of the coxæ; the apical joint of the tarsi is brown. The wings are yellowish at the base and colourless at the apex; the stigma is black, from which a curved band of a brown colour extends across the wing. The costal margin as far as the stigma is yellow; the principal nervures are black; the transverse and some of the longitudinal nervures are milk-white (fig. 15).

With us this species is scarce, but in some parts of Scotland it appears to be rather common; it also occurs in North Germany, among other places at Insterburg and Königsberg. The male is still undiscovered.

CALANDRA ORYZÆ AND ITS ASSOCIATES.

By T. R. BILLUPS.

HAVING a vacancy left in my cabinet for *Calandra oryzæ* and its allied species *granaria*, I asked my friend Mr. Fitch, to whom I am greatly indebted, if he could give me any assistance with those species to fill up the space thus left. That gentleman, with his usual kindness, at once consented to help me with the required desiderata, and on the 3rd of September last I received from him a box containing not quite three and a half ounces of dust, broken bits of corn, or, more properly speaking, the remains of what had been bored out, rubbish, &c., presumably collected up from one of that gentleman's granaries or storehouses. I had not the slightest idea of receiving more than one, or probably two dozen at the most, of the insects I required; but one may judge of my surprise when, on opening the box, I found it literally teeming with insect life; not only with *Calandra*, but with several other species of Coleoptera. To capture the whole of these was no mean task—in fact, one I did not easily accomplish; however, after much patience, I succeeded in getting most of them into the laurel-bottle. Thinking the results might not be uninteresting to many of your readers induced me perhaps to be somewhat more careful than I should otherwise have been.

Mr. Fitch, in his very interesting and studious article on "Granary Weevils" in the February number of this year's 'Entomologist,' speaks of having met with no less than fifteen different species of Coleoptera in company of *Calandra*; and as his experience is the result of three years' hard study, I am somewhat surprised he has not met with more, considering that out of so small a quantity as three and a half ounces of borings, &c., I should meet with no less than eleven, besides the two *Calandra*, and two of those are not mentioned by that accurate observer in his list before mentioned. The numbers and species captured by myself were as follows:—*Calandra oryzae*, or the rice weevil (650), *C. granaria*, the true corn weevil (17). Then come their companions, but whether in mischief or not is somewhat doubtful,—*Hypophlaeus depressus* (791). Cox, in his 'Hand-book of the Coleoptera of Great Britain,' speaks of this insect as being not common; at any rate, if numbers are any criterion in the case, they were the most plentiful. Then comes the curious little *Silvanus surinamensis*, with its row of teeth on each side of the thorax (45), the pretty and very active *Alphitophagus quadripustulatus* (21); of the dark brown *Rhizopertha pusilla*, which Mr. Fitch says he found so abundant, there were only fourteen; and of the flat red-yellow *Læmophlaeus ferrugineus* (5); of *Typhæa fumata*, one of the insects not yet found by Mr. Fitch, and mostly to be met with at stack-bottoms, there were five; of the flat black or red-brown *Trogosita mauritanica* four. In addition there were two of *Tenebrio molitor*, the larvæ of which are the well-known mealworms; and last, but not least, there was one *T. obscurus*. This Mr. Fitch does not mention among his observed insects, but he tells me he has some five or six of these creatures, walking about one of his old stores, collected in 1876 and 1877. The total number of living insects taken by myself was 1554, irrespective of those which were too active for me and got away, and the dead, perfect and broken imagos were nearly in the same ratio, to say nothing of the larvæ, which I did not attempt to count. I think, after looking at the numbers taken from so small an amount of rubbish, one can scarcely be surprised when reading Mr. Fitch's startling account of the vast quantities of corn and other grain destroyed by the two *Calandras*, leaving out of the question what part of economy their associates may play, and which seems at present, as I said before, somewhat

doubtful. The fecundity of the *Calandra* can scarcely be imagined, as it is reputed to be one of the most prolific of coleopterous insects. If report speaks truly, that a single pair may produce six thousand in one year, we may well enquire what remedy we have to check the ravages and enormous damage of these insect pests.

While writing this the post has brought me a note from Mr. Fitch, in which he says:—"I have sent you a few more granary Coleoptera in hopes that *Hypophlæus* at any rate will not now be a desiderata to either yourself or friends." The contents of this box will form the subject of a second note.

4, Swiss Villas, Coplestone Road, Peckham, October 4, 1879.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

EFFECT OF THE WET SUNLESS SEASON ON THE LEPIDOPTERA OF THE NEW FOREST.—I visited Lyndhurst on 10th July, and returned to town on Tuesday, 12th August; during the whole period I do not think a day passed without rain. As might be expected, there was a retardation of the time of appearance of all Lepidoptera, but especially the Rhopalocera. *Argynnis Paphia* and *Argynnis Aglaia* were not seen on the wing till 18th July; the males of *Paphia* were not abundant until the end of the month, and the females not before the early part of August. *Argynnis Selene*, which usually appears early in June, was on the wing the whole of July, and I captured a female on 11th August apparently but just emerged from the chrysalis. *Argynnis Adippe*, which is sometimes met with late in June, appeared first on 19th July and continued on the wing till the period I left, viz., 11th August. *Limenitis Sibylla* was first seen 21st July, but it was not till August had arrived that the species appeared in any abundance. But the most noteworthy fact was, that the weather was so cold that the swift-flying butterflies *A. Paphia* and *L. Sibylla* were benumbed, and could, even in the middle of the day, be easily taken off the brambles with the fingers; and on one occasion when I placed my net over *A. Paphia*, var. *Valezina*, the specimen fluttered down amongst the herbage and allowed me to take it in my cyanide bottle. It was startling to observe *Limenitis Sibylla* flapping along as slowly as a *Pieris*, and I often thought of

Mr. Stainton's remark on this species in his 'Manual of British Butterflies,' page 22, that it was "oftener seen than caught." The butterflies above-mentioned were very abundant, and I counted thirty specimens of *Argynnis Paphia* within reach of my net at one time. The above instances are sufficient to illustrate the peculiar effects of the season on the time of appearance of Lepidoptera, and I will add only in conclusion that I have now, still feeding, larvæ of *Ænisti quadra*, the perfect insect generally appearing in July, but this year no imagines were taken till after the first week in August.—J. JENNER WEIR; 6, Haddo Villas, Blackheath, September 7, 1879.

COLIAS EDUSA ABUNDANT AT FOLKESTONE.—This insect is now abundant between Folkestone and Sandgate. Nearly all the males are remarkably small, while the females are of the usual size. I saw one of the variety *Helice*, but did not take it.—H. RAMSAY COX; Folkestone, September 19, 1879.

ABUNDANCE OF COLIAS EDUSA AT DOVER.—During a visit to Dover, extending from the 14th to the 22nd of September, I observed *Colias Edusa* in large numbers. Three collectors, who were working for varieties, took amongst them upwards of 300 specimens. The females seemed to be the most numerous. I captured two fine specimens of the variety *Helice*, and saw seven others captured in one day. They seemed very local, and I only saw them on the Castle Hill.—THOS. EEDLE, Jun.; 37, Dunloe Street, Hackney Road, E., October, 1879.

CAPTURES AT OBAN.—At Oban, in the West Highlands of Scotland, this year I have taken *Erebia Blandina* in abundance. *Argynnis Aglaia* also was very plentiful, while *Pyrameis cardui* and *Plusia gamma* literally swarmed.—C. D. SNELL; 56, Jeffrey's Road, Clapham Rise, S.W., September 13, 1879.

EXTRAORDINARY ABUNDANCE OF PYRAMEIS CARDUI AND PLUSIA GAMMA IN SAXON SWITZERLAND.—I have noticed the numerous notes in September's 'Entomologist' on these two insects, and have found that there is the same abundance here as there appears to be in England. *P. cardui* literally swarms about the cherry and other fruit trees which are planted by the roadside. As far as I can judge, no other species is intermixed with them; when I pass by the clover-fields they rise in clouds. It is next to impossible to net any small butterfly of any consequence in the

daytime, owing to the enormous number of *P. gamma* which rise from the grass as I walk through it, and at night the rooms are filled with them if the windows are left open; they almost put out the lights by knocking up against them. I have never noticed anything like this profusion before. Last year I saw very few *P. cardui* here, and the number of *P. gamma*, in comparison with this summer, was very limited.—C. W. THWAITES; Villa Rosa, Wehlen, Saxon Switzerland, September 8, 1879.

DIURNI OBSERVED IN THE STREETS OF MANCHESTER.—If additional proof were needed of the unusual abundance of *Pyrameis cardui* this summer, it would surely be found in the fact of a fine specimen having been observed by me yesterday morning flying in almost the centre of Manchester. I have also observed *Pieris rapæ*, *Vanessa urticæ*, and *Polyommatus phlæas* at different times in the streets here; and *V. Io* and *V. Atalanta* occur in most years in the streets and suburbs, though I have not observed them this abnormally wet summer.—J. C. MELVILL; Prestwich, September 5, 1879.

ACHERONTIA ATROPOS AT SHREWSBURY.—A very good specimen of this moth was taken at Ascham this week, and is now in the possession of the Rev. Loftus Owen. It is a great rarity here at the present time, but in the year 1870 the larvæ were exceedingly common on the potato and tomato.—B. PRITCHARD; Frankwell Nursery, Shrewsbury, Sept. 18, 1879.

ACHERONTIA ATROPOS AT SEA.—I have just received a fine living specimen of *A. Atropos*, caught on board the 'Cork' light-ship, which is moored seven miles from the land.—F. KERRY; 22, Maria Street, Harwich.

BOMBYX CASTRENSIS NEAR HARWICH.—In August last I caught some larvæ of *Bombyx castrensis* on the bentlings near here. I might have taken many more, but not knowing what they were I did not take more than fifty. These began to spin up the same day, and the imagos appeared in September. The eggs from which these larvæ were hatched must have been under the water twice in every twenty-four hours during the winter months.—F. KERRY; 22, Maria Street, Harwich.

AERONYCTA ALNI.—Mr. J. Cooke, of 4, Newdegate Street, Radford, found, on September 21st, a larva of *A. alni*, feeding upon oak in Wollaton Park.—JOSEPH BROOKS, Sec.; Nottingham Working Men's Naturalist Society.

ACRONYCTA ALNI.—A larva of this rare moth was found at Sherringham, near Cromer, August 22nd last year, feeding on Spanish chestnut. Acting on advice we placed a hollow bramble stem with it, and it was soon taken possession of by the larva for pupation. A fine imago emerged May 22nd.—H. MILLER; Ipswich, October, 1879.

LEPIDOPTERA AT GUILDFORD.—It may interest some of your readers to know that, at Guildford, *Abraxas grossulariata* has become abundant and variable, the alar markings being seldom constant, and very often the two superior wings having different patterns. Insects seem on the whole to have been retarded in development by the wet season, especially those bred in confinement. The summer roses were all destroyed by the Tortrices, the cankerworms of our poets, but not of our Biblical Translators, who employ the word, I hold, for immature locusts.—A. H. SWINTON; Birfield House, Guildford.

LITHOSIA MESOMELLA IN THE NEW FOREST.—May I be permitted to answer Mr. Goss's note (Entom. xii. 205)? I rather fancy he must have misunderstood the drift of my remarks (Entom. xii. 106), and though the matter is not of much importance, I hope he will excuse me for correcting the error into which he seems to me to have fallen. My chief object in penning the note on the *Lithosiidæ* was to point to their rarity as a class, and that of the other lichen-feeding species to be captured in the Lyndhurst district, as compared with some other species whose food-plants are not nearly so abundant in the Forest,—for instance, *Limenitis Sibylla*. Mr. Goss will, I dare say, recollect that besides the immense amount of lichen which has spread over the trees and bushes in the Forest to such an extent that it alone may be said to preponderate over the amount of food supplied by the leaves of any one species of tree grown there, the soil of all the heaths is densely overgrown by the ground-lichens, which, I believe, form the food-plants of *Lithosia mesomella*. Looking at these facts, it seemed to me rather odd that while the *Argynnidæ* and *L. Sibylla*—all of which are exposed, as larvæ, like the *Lithosiidæ*, to the risk of hibernation—are usually common and frequently swarm, one might, during the two seasons I had an opportunity of looking after them, have worked for *Lithosiidæ* evening after evening and hardly seen a

score altogether.—B. LOCKYER; 27, King Street, Covent Garden, W.C., August 5, 1879.

ÆNECTRA PILLERIANA, FEMALE.—Last June, in the Isle of Wight, I gathered various low plants, the shoots, leaves, and flowers of which were being fed upon by larvæ, but unfortunately, being as little acquainted with some of the plants as with the larvæ thereon, I placed the whole collection in a large flower-pot. The results, as might be expected from such a desultory mode of breeding, were not of a very brilliant character. However, I had the pleasure of obtaining several female specimens of *Ænectra Pilleriana* by this arrangement. This sex has not, I believe, been hitherto recorded. I may add that all my captured specimens of this species, about seventy in number, were males.—RICHARD SOUTH; 13, Bonchurch Villas, Ealing, October 20, 1879.

A NEW LOCALITY FOR *EXÆRETIA ALLISELLA*.—In the months of January and February last I devoted much time to collecting the various root-feeding larvæ in the lanes about Banstead Downs, and during July was much surprised to breed, along with numbers of *Ephippiphora fœneana* and *Dicrorampha simpliciana*, twenty-three fine specimens of *E. Allisella*. As far as my observations go, I should be inclined to agree with Dr. Schleich (Nat. Hist. Tineina, vol. xiii., p. 394), that the larva bores down the stem into the root, and so hybernates, or feeds slowly through the winter. All the roots I brought home were cut down close previously to my digging them up, and the earth well shaken out, so that the larva must have been in the bottom of the stem close to the root or in the root itself. I can hardly reconcile the above habit with that of causing the shoots to droop in May (Id., p. 322). The shoots that are up at that time are all new ones, and the larva nearly, if not quite, full fed. As the imagos are out in July, it is more likely the shoots would appear to be drooping in August through the operations of the larva inside. I do not think it possible that the larva, being so near maturity as it would be in May, would quit the root or stem to bore into a fresh stem.—G. ELISHA; Shepherdess Walk, City Road, N.

PRIONUS CORIARIUS AT KEW.—Whilst taking a stroll one day at the end of last August in the pleasure-grounds of Kew Gardens, I observed on the trunk of one of the trees a beetle, which proved to be a fine specimen of *Prionus coriarius*.—HAROLD HODGE; 33, Almorah Road, Islington, N., September, 1879.

CANTHARIS VESICATORIA, *Linn.*—The blister-beetle is of sufficiently rare occurrence in England as to make the capture of it worthy of notice. A single specimen was taken on the 8th of September by my friend, Mr. H. T. Mennell, at Freshwater, Isle of Wight, sunning itself on a leaf of the common nettle. This insect, when caught, and for several days after it was killed, emitted a very powerful and offensive odour, and the box it was pinned in was perfumed by it with a scent very strongly resembling a dead mouse in a state of decomposition.—V. R. PERKINS.

DELEASTER DICHROUS.—While sitting at supper with friends at Hythe, on the 6th June, an insect flew into the flame of the gas and fell on to the table. Perceiving it was a beetle I secured it, and subsequent examination proved the value of the capture. A few evenings later I caught a second specimen on the wing. This is the first time I have met with this species, and know nothing of its habits. It is certainly a very conspicuous insect on the wing.—THOMAS H. HART; Kingsnorth, Kent.

AN ALLEGED INSTINCT OF MOSQUITOES.—It is commonly stated that when a mosquito is engaged in sucking the blood of its victim it holds up its posterior pair of legs and by their means perceives the agitation of the air caused by an approaching hand in time to avoid the blow. On examining gnats, whether resting upon a window-pane, a rail, or any other body where blood-sucking is out of the question, it will be found that in a majority of cases they adopt this same attitude, either with both the hind legs, or at any rate with one of them. Nor do they seem aware of an approaching hand sooner than many other insects.—J. W. SLATER; Aylesbury, September, 1879.

SUGGESTED REMEDY FOR INJURIOUS INSECTS.—In a recent number (June, 1879) of the 'Canadian Entomologist' there is a four-page article by Dr. H. Hagen, in which the suggestion is thrown out that the use of beer mash or diluted yeast would prove beneficial in destroying certain destructive insect pests, where syringing or direct sprinkling of the pests is practicable. This recommendation has not been put to actual test, but the author brings it forward on the ground that "it is neither an hypothesis nor a guess-work, but simply the application of true and well-observed facts." The remedy is founded on the data said to have been proved by Dr. Bail, of Prussia, by actual experiments

extending over a dozen years, that the fungus of the house-fly, common mould, the yeast fungus, and a fourth small water fungus are all forms or developments of one and the same species. The presence of fatal epizootics amongst certain insects is well known to all entomologists, but whether their communication and action can be readily controlled we must leave to positive proof. So simple a remedy is well worthy of a trial on any attack of *Aphides*, gooseberry grub (*Nematus ribesii*), which has been so destructive this year, gregarious lepidopterous larvæ, or other easily come-at-able pests.—EDWARD A. FITCH.

PRIZE ESSAYS.—Not only will our scientific, but also our sporting, readers hear with satisfaction that Lord Walsingham in conjunction with other gentlemen has offered prizes for the most complete life-histories of *Sclerostoma syngamus* and *Strongylus pergracilis*. The following are the particulars:—"£50 for the best and most complete life-history of *Sclerostoma syngamus*, Dies., supposed to produce the so-called "gapes" in poultry, game, and other birds; £50 for the best and most complete life-history of *Strongylus pergracilis*, Cob., supposed to cause the grouse disease. No life-history will be considered satisfactory unless the different stages of development are observed and recorded. The competition is open to naturalists of all nationalities. The same observer may compete for both prizes. Essays in English, French, or German, to be sent in on or before October 15th, 1882, addressed to the Secretary of the Entomological Society, 11, Chandos Street, Cavendish Square, W."—ED.

REVIEW.

Scientific Lectures. By Sir JOHN LUBBOCK, Bart., M.P., &c.
188 pp., demy 8vo. London: Macmillan & Co. 1879.

IN his preface Sir John Lubbock apologises that this book "does not contain anything new to those who have specially studied the parts of science with which it deals;" but he very properly adds that he hopes "it may be found to present the fact in a condensed, yet interesting form." Of this there is no doubt, for from first to last it has rarely been our fortune to meet with a more interesting and readable book. It consists of six

lectures, the first on Flowers and Insects, the second on Plants and Insects, two on the Habits of Ants, and two on Archæological subjects. The first four more directly appeal to the readers of the 'Entomologist,' but the other two cannot fail to interest the general reader, even be he not an archæologist. There are fifty-four carefully-drawn illustrations, and a coloured plate of the various stages of the larva of *Chærocampa porcellus*. Of these illustrations fifty-one are spread over the first four lectures. We cannot speak too highly of these illustrations. Being chosen by the author with such good judgment, they represent in every instance so exactly what he wishes to convey that even the youngest student cannot fail to understand their purport.

In the first lecture Sir John Lubbock shows the relation of flowers and insects, and the absolute necessity of the one to the other. After shortly referring to the work of former students on this subject, especially Mr. Darwin, he touches upon the carnivorous habits of some plants, and then enters upon the real subject of the lecture, viz., the fertilisation of plants by insects. It is most difficult to quote from a book where every page is alike interesting, but we cannot refrain from quoting to show the pleasantly simple language used, and language which so thoroughly conveys the author's meaning. Having explained the use of the different organs of a flower, in words and by illustrations, and their use in perpetuating their species, he says, on page 5 :—

"Everyone knows how important flowers are to insects; everyone knows that bees, butterflies, &c., derive the main part of their nourishment from the honey or pollen of flowers, but comparatively few are aware, on the other hand, how much the flowers themselves are dependent on insects. Yet it has, I think, been clearly shown that if insects have been in some respects modified and adapted with a view to the acquirement of honey and pollen, flowers, on the other hand, owe their scent and honey, their form and colour, to the agency of insects. Thus the lines and bands by which so many flowers are ornamented have reference to the position of the honey; and it may be observed that these honey-guides are absent in night flowers, where they of course would not show, and would therefore be useless, as for instance in *Lychnis vespertina* or *Silene nutans*. Night flowers, moreover, are generally pale; for instance, *Lychnis vespertina* is white, while *Lychnis diurna*, which flowers by day, is red."

Again, at page 9 :—

"The transference of the pollen from one flower to another is, as

already mentioned, effected principally either by the wind or by insects, though in some cases it is due to other agencies, as, for instance, by birds, or by water. For instance, in the curious *Vallisneria spiralis* the female flowers are situated on long stalks which are spirally twisted, and grow very rapidly, so that even if the level of the water alters, provided this be within certain limits, the flowers float on the surface. The male flowers on the contrary are minute and sessile, but when mature they detach themselves from the plant, rise to the surface and float about freely like little boats among the female flowers. Wind-fertilised flowers as a rule have no colour, emit no scent, produce no honey, and are regular in form. Colour, scent, and honey are the three characteristics by which insects are attracted to flowers."

Speaking of the white dead-nettle (*Lamium album*), at page 17 :—

"In the first place, the honey attracts insects. If there were no honey, they would have no object in visiting the flower. The bright colour is useful in rendering the flower conspicuous. The platform serves as an alighting stage for bees. The length of the tube has reference to that of their proboscis, and prevents the smaller species from obtaining access to the honey, which would be injurious to the flower, as it would remove the source of attraction for the bees, without effecting the object in view. The upper arch of the flower protects the stamens and pistil, and also presses them firmly against the back of the bee. So that, when the bee alights on the stage and pushes its proboscis down to the honey, its back comes into contact with them. The row of small hairs at the bottom of the tube prevents small insects from creeping down the tube and stealing the honey. Lastly, the small processes on each side of the lower lip are the rudimentary representatives of parts, formerly more largely developed, but which, having become useless, have almost disappeared."

Concluding the first lecture, Sir John says :—

"For it is obvious that any blossom which differed from the form and size best adapted to secure the due transference of the pollen would be less likely to be fertilised than others ; while on the other hand, those richest in honey, sweetest, and most conspicuous, would most surely attract the attention and secure the visits of insects ; and thus, just as our gardeners, by selecting seed from the most beautiful varieties, have done so much to adorn our gardens, so have insects, by fertilising the largest and most brilliant flowers, contributed unconsciously, but not less effectually, to the beauty of our woods and fields."

Lecture No. 2 is of great interest to the lepidopterist, for amongst other subjects the author seeks to show the use of the

colours and markings of various larvæ. This lecture is very fully illustrated both with woodcuts and by the coloured plate. After very fully discussing this subject, in conclusion he says:—

“I think we see reasons, for many at any rate, of the variations of colour and markings in caterpillars, which at first sight seem so fantastic and inexplicable. I should, however, produce an impression very different from that which I wish to convey, were I to lead you to suppose that all these varieties have been explained, or are understood. Far from it; they still offer a large field for study; nevertheless I venture to think the evidence now brought forward, however imperfectly, is at least sufficient to justify the conclusion that there is not a hair or a line, not a spot or a colour, for which there is not a reason,—which has not a purpose or a meaning in the economy of nature.”

The third and fourth lectures are devoted to Sir John Lubbock's favourite study, the habits of ants. These pages are most readable, for they treat of, amongst other economy, the food of ants, their modes of warfare, their slaves, division of labour, recollection of friends, agriculture among ants, powers of communication, and so many other senses and habits that we cease to wonder at the fascination this group of insects has for the author.

We cannot too strongly recommend this book to our readers, and no village library should be without it. Thoroughly scientific, it is written so popularly that it reads as easily as a story book. It is suitable alike for the school boy, the gardener, the farmer, the entomologist, and the general reader. In fact we cannot conclude our pleasant duty of noticing so charming a book without congratulating the author upon his happy thought of publishing these lectures.—J. T. C.

OBITUARY.

WILLIAM WILSON SAUNDERS, F.R.S., F.L.S., &c. — Mr. Saunders died at Worthing, September 13th last, in his seventy-first year, having been born June 4th, 1809. He was born near Wendover, Bucks, and was the second son of the Rev. James Saunders, the Vicar of Kirklington, Oxfordshire. Educated at Addiscombe, he eventually joined the Honourable East India Company's service as an engineer; but after a short absence of about a year, he returned to this country in 1832. Having devoted much of his leisure while in India to the study of Natural History, he brought back collections of insects and plants, and while there he published at least one scientific paper. Having married and

resigned his Indian post, he settled at Wandsworth, and joined his wife's father in business as an underwriter at Lloyd's; of which Committee he in time became Chairman, and a most able member. He was exceedingly successful in business and amassed a large fortune, only to be lost, when the firm of which he was the head suddenly failed in 1873. Prior to this date his ample means were always at the service of scientific research. It was he who gave impetus to the foreign collection of plants and insects. Had it not been for his liberality many successful collectors could never have forwarded home their rich stores of undescribed species. To this liberality and his ample means are to be ascribed his chief use to science; for his many business and other duties left him little time for actual scientific work. Nevertheless many valuable papers, on both Entomology and Botany, from his pen may be found in the 'Transactions' of the various learned Societies, of which he was a leading spirit. On the formation of the Entomological Society he was one of the original members, and at a later period was President of that Society on three occasions. In addition to the sciences mentioned, he long studied the economic value of various woods in regard to their durability, &c. His collection of these was shown in the Exhibition of 1851. In 1857 he removed his then extensive collection to Hillfield, Reigate, which later became so celebrated as the home of a man ever ready to help his less fortunate fellow-workers, by reference to his collection and his extensive knowledge. These collections rapidly grew until they had, in the unfortunate year 1873, attained a greater extent probably than any other privately made. They consisted of insects of all orders, dried plants, woods, birds, shells, &c., while his gardens contained well nigh every rare exotic plant which could be obtained. So great was his success in the study of horticulture that in 1868 he edited and published the first part of 'Refugium Botanicum,' with the assistance of Mr. J. G. Baker and Prof. Reichenbach for the descriptions; but many of the plates are from his own drawings, while others are by the well-known botanical artist, Mr. J. N. Fitch. Mr. Saunders also edited 'Insecta Saundersiana' and 'Mycological Illustrations'; in this latter he was assisted by Messrs. Worthington Smith and A. W. Bennett. Mr. Wilson Saunders was elected Fellow of the Royal Society in 1853, of the Linnean Society in 1833, was at one time a Vice-President of the Royal Horticultural Society, and was

founder of the Reigate Natural History Club. Nor was he a mere member of these and various other Societies, for he held important offices at one time or other in most of them. Since his failure in 1873, when his collections were distributed by sale, he had resided at Raystead, Worthing, and even up to a short time before his death adding to his already numerous contributions to the knowledge of horticulture by communicating several papers to the Royal Horticultural Society. The loss to Science by his death is great, for few men have done more, directly or indirectly, to give that impetus to the study of Natural Science which caused it to make such rapid strides during the prime of his life, than William Wilson Saunders.—J. T. C.

JAMES COOPER.—Mr. Cooper was born at Graysouthen, near Cockermouth, October 19th, 1792, and died, in the eighty-seventh year of his age, on August 1st, 1879, at Atherton's Quay, near Warrington. In his early life he was a handloom-weaver, and comparatively uneducated; but he soon removed the latter disadvantage by close study, and a closer observation of Nature in its wildest home,—the then little known, scientifically, mountain moorlands of his native county. In due course Mr. Cooper became an accomplished naturalist, excelling in Ornithology and Entomology. Living at a period when the fauna of these isles was less known than now, he added many new species to the British lists of birds and insects, *Petasia nubeculosa* and *Cerura bicuspis* being amongst the latter. Mr. Cooper was appointed curator of the Warrington Museum in 1848, then a very small representative of the few Natural History collections in the provinces. Here he remained until 1852, when he went to live at Preston for a second time, and afterwards spent some time exploring the little-known district of Rannoch. In 1855 Mr. Cooper returned to his post at the Warrington Museum, where he remained until 1874, when he resigned the curatorship. From this time until his death matters were not happy with him in a worldly sense, illness and misfortune sorely pressing on him. Many scattered records from his pen will be found in the Natural History works of his day, and Mr. Yarrell received much assistance from him when writing his works. Living at a period earlier than most of us can remember, he was little known to this generation, but in his time he contributed greatly to the knowledge of Natural History, and he was always one of Nature's gentlemen.—J. T. C.

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T H E P A S T Y E A R .

By EDWARD A. FITCH, F.L.S.

BEFORE the recollection of entomological experience during the past extraordinary season passes away, it is well perhaps that a few notes should be preserved.

A winter of exceptional severity was followed by a sunless and chilly spring, and then by a summer and early autumn remarkable for excess of rain and deficiency of heat. The year was altogether persistently wet, sunless, and ungenial. The effects of such a season on insect-life have naturally been very marked. Statisticians tell us that we must go back as far as the year 1816 for a similar season, while others can only compare it with the records of 1764. A later year, 1860, which is in the memory of most of us, was peculiarly devoid of summer weather, though by no means so abnormal as 1879. It serves better, however, for comparison in entomological matters. The preceding winter of 1859—60 was protracted though not very severe, thus differing from that of 1878—9; still we find *Pieris napi*, *Phigalia pilosaria*, *Biston hirtaria*, &c., recorded as captured at large in January. The winter of 1860—61 was, however, exceptionally severe, and the summers of 1858 and 1859 had been exceptionally hot; the records of British captures of many European species relate to those years. The summer then of 1860 was a greater contrast to its predecessors than our late one. Comparing the two years, 1860 and 1879, entomologically, there is much in common. In the 'Entomologist's Weekly Intelligencer' (vols. 8 and 9), and 'Zoologist' (vols. 18 and 19), are constant notes on late appearances, and towards the end of the season the opinion that the year had been generally unprofitable was stoutly combated by several correspondents. Large takes of larvæ were especially instanced; various Hymenoptera, as wasps, *Bombi*, &c., are

spoken of as conspicuous by their absence, but the Coleoptera and Hemiptera do not seem to have suffered so much as the more sun-loving orders. As this year (1879) we have conspicuous exceptions to the general absence of insect life by the unwonted abundance of *Pyrameis cardui* and *Plusia gamma*, and a few other species, so in 1860; for in that year many specimens of *Deilephila livornica* were captured in the spring, and a few *Chærocampa celerio* in the autumn. Specimens of both have also been taken this year. Both then, as now, the abnormal absence or presence of various species, and their early or late appearances, were abundantly remarked upon, but in very few, if any, instances was a cause looked for. This is to be regretted, though we quite allow there are great difficulties attending the enquiry.

The past season has probably been the most disastrous on record in these islands. Crops of all descriptions are exceptionally poor and unmaturing; in many cases they have altogether failed to ripen. As regards honey "the results are absolutely *nil*, and where the bees have not been artificially fed they were last autumn and end of summer already perishing by thousands of starvation. Not one hive in fifty can possibly survive the winter if left to subsist on the honey collected during the past sunless summer. A summer entirely without parallel in apian annals." If we add to this gloomy state of affairs under domestication the immense nest-building difficulties of certain Hymenoptera in such a season, we can well imagine how severely all genera of bees and wasps have suffered.

Of late appearances in Lepidoptera it is useless to multiply instances; they have been abundantly referred to in the pages of the 'Entomologist': suffice it to say that here the first *Pieris rapæ* noticed was on May 5th, and the first *P. brassicæ* not till June 13th. All early summer species were about a month later; this was not only the case with insects, but the phenological observations collected by the Meteorological Society show it to have been the case with the flowering of plants and the leafage of trees. The pages of the 'Zoologist' and 'Field' confirm it more clearly by the records of the arrival of our migratory birds. Fish likewise have been affected, for many species have been altogether abnormal in their movements. The season was altogether fully a month late; the well-known St. Mark's fly (*Bibio Marci*), is particularly regular and short-lived in its

appearance at the end of April, whence its name (St. Mark's Day, April 25th). I only saw it on one day this year, and that sparingly, on May 14th. In some few instances periodicity is said to override the influence of temperature; in a paper on this subject (Trans. Ent. Soc. Lond., 3rd ser., vol. i., p. 63), Dr. Verloren especially mentions Swammerdam's and Réaumur's *Ephemeridæ*, and makes some very pertinent remarks on the appearance of several Lepidoptera.

The comparative abundance of certain species is of more interest. Butterflies generally have been scarce, and here I have not seen a single *Thecla* or *Lycæna* the whole year. *Thecla rubi* mostly occurs in my garden in the spring, and *T. W-album*, in some years, is not rare on the blackberry bushes in autumn. These inconspicuous species may possibly have been overlooked, but not so the brilliant little *Lycæna Icarus* and *L. Argiolus*, which I never before failed to see in numbers. Not one of either this year; and, curiously, not a single *Polyommatus Phlæas* till September 10th. *Chortobius Pamphilus* has also been very rare; a few were noticed on June 19th, but no autumn specimens occurred. The *Pieridæ* have been by no means common; August 24th was the only day on which they were seen in any quantity. *P. brassicæ* has been rare throughout, but from North Germany we hear of swarms of this species occurring towards the end of August, whence they travelled southwards. I saw a few *Gonepteryx rhamni*, both hybernated and fresh individuals, but all males; hybernators occurred till June 28th. Of *Colias Edusa* I found one most dilapidated female on September 26th, flying—or rather trying to fly—at ten minutes past five in the afternoon. I confined this over some growing and blooming white clover (*Trifolium repens*), hopeful of eggs, but had no success; it was found dead on September 29th. This is the only living *Colias* I have seen since 12th December, 1877, although it has occurred in many localities this year. The *Vanessidæ* and *Satyridæ* have been generally common, with but few *Hesperidæ*. The lessons learned from our British butterflies would be that those species which were exposed pupæ (*Pieridæ*) throughout the winter suffered greatly from natural enemies, as birds, woodlice, &c., owing to the scarcity of other food, while the larval and imago hybernators (*Satyridæ* and *Nymphalidæ*) were fairly safe, owing to the unbroken continuity of the cold.

The great entomological event of the past year has been the extraordinary abundance of *Pyrameis cardui* and *Plusia gamma*. The causes of this, however, are not inherent to this country, as both were migrants here, coming originally we know not whence, though probably from somewhere in Africa. The swarm, starting from N.W. Africa, was observed at Algiers as early as 15th to 20th April, travelling in a north-easterly direction; it reached the neighbourhoods of Valencia and Barcelona by April 26th to 30th, spread over Spain, touching the Balearic Isles May 1st to 3rd, and crossed the Eastern Pyrenees on May 26th and 27th. It was distributed over South-east France, Switzerland, and North Italy, and on the morning of June 5th thousands of living specimens were found on the snow at the Hospice of St. Gothard. It then spread over Germany and Austria, being recorded in the various localities on dates varying from the 7th to 16th June. Another column crossed the Mediterranean to Sicily, and spread itself northwards over Italy in June. The more westerly end of the migratory swarm reached Strasburg as early as 3rd to 9th June, Bisheim (Alsace) on June 8th, Angers and Rennes, in France, on June 10th. Paris and its environs were not apparently reached till June 15th. It arrived on our south coast on June 10th, whence it spread throughout the three kingdoms; specimens first noticed here (Maldon) on June 13th. Although I have spoken of this extraordinary and unexplained migration in the singular, it is not to be supposed that the multitudes of specimens came all in one column; we have direct evidence to the contrary. Its tracing does not altogether rest with British entomologists; we know that the swarm was far from exhausted when it reached these shores, and *P. cardui* has occurred almost everywhere in the greatest profusion, though possibly not in such immense numbers as occurred along the Rhine, where in many localities its resultant larvæ became a destructive pest to the cultivators of artichokes and *Artemisia*. Many interesting hypotheses have been started to account for this true case of butterfly migration, which is not altogether a new thing with *P. cardui*. None appear altogether satisfactory. *P. cardui* is the most widely distributed of all lepidopterous insects, and follows the general rule of the animal and vegetable kingdoms, that "the most widely spread species are those capable of withstanding the greatest climatic changes and adapting themselves to the greatest diversities of topography."

This species has, however, always been remarkable for the uncertainty of its appearance; in some years even for its total absence in localities where it had previously been abundant. The greater part of our June specimens were doubtless immigrants, and the summer and autumn specimens their progeny. I found the larvæ commonly early in August, in their curious spider-like webs, on *Carduus arvensis*, but much more generally on those isolated thistles amongst the corn which this year have been so abundant. On the Continent almost every species of thistle and even the common nettle (*Urtica dioica*), have afforded food for the numerous larvæ. My first bred specimen pupated on August 9th, and emerged on 14th. I lost my three late pupæ by introducing *Thamnotrizon cinereus* into the cage, who soon devoured them. This was not my only loss through these insectivorous practices, for I collected some thirty or forty larvæ of *Stratiomys*, which have been unusually common this year, and all of them became the prey of two specimens of *Gammarus pulex*, which had inadvertently been introduced into the aquarium. I had hoped to have bred the pretty chalcideous *Smicra*, which is parasitic on these curious aquatic larvæ. Although these larvæ were so common I only saw one imago, and that was a specimen of *Stratiomys furcata*, which I captured on a wild parsnip bloom on August 15th.

In many of the numerous notes on the extraordinary abundance of *P. cardui*, it has been remarked how *Plusia gamma* appeared to accompany it in its migrations. This has been equally observable throughout Britain, where both species occurred on our coasts simultaneously; although the imagos of *P. gamma* have occurred in the greatest profusion we have but few records of the larvæ in these islands. There is one notable exception (Entom. xii., 222). It is far otherwise on the Continent, for thence, where this larva is by no means an unknown destructive, we have deplorable news of its serious depredations amongst clover and lucerne, and particularly flax and peas. I have found imagos of *P. gamma* from January to December; indeed it is a question in which state this species hybernates, and larvæ of *Pyrameis cardui* have been found in this country as late as October (Entom. xi., 19); both species can indeed withstand great climatic changes. Some few other species of Lepidoptera have been unusually common; here, as in many other localities,

Abraxas grossulariata has swarmed in altogether unprecedented numbers. During the first fortnight in June the larvæ were particularly abundant on the blackthorn hedges, and so continued for some time. Contrary to all previous experience, although I made repeated search both in my own and other gardens, not a larva was to be found on either gooseberry or currant. The first imago was captured on July 24th, larvæ being still abundant, and imagos continued more or less common until September 19th. *A. grossulariata* hibernates quite exposed as a very young larva. Mr. Silcock's (Entom. xii., 20) and other notes appear to refer to some abnormal second brood. At the September meeting of the Entomological Society Mr. W. C. Boyd referred to the extraordinary abundance, presumably of the second brood, of *Anaitis plagiata*; this also has a hibernating larva. I have found *Odonestis potatoria* especially abundant, both as larvæ and imagos, and many other species, e.g., *Lithosia quadra*, *Emmelesia decolorata*, *Eupithecia expallidata*, &c., have been noticed in these pages. I found *Sesia myopæformis* very abundant, with *Cossus ligniperda* and *Zeuzera æsculi* common, as usual, though late; these and other internal feeders are probably but little subject to climatal conditions in their earlier stages. Many familiar Lepidoptera I have altogether missed this year. *Pygæra bucephala* larvæ often quite defoliate certain elm trees and sallow bushes near here; this year I have not seen the species in any stage. Almost the same remark will apply to *Bombyx neustria*. Plum pies, especially of the black damson variety, have been particularly enjoyable this autumn by the knowledge that the unsavoury larva of *Opadia funebrana* altogether *non est*; neither have I seen the closely allied *Carpocapsa pomonana*, although the imagos were perhaps more than usually common last July. As an instance of unusually early appearance I may say I bred a single specimen of *Eupæcilia vectisana*, indoors though, on June 12th.

Miss E. A. Ormerod has already made some remarks on the effect of temperature on insect development in our June number, and in a paper read before the Entomological Society (Trans., 1879, pp. 127—130). In discussing this latter paper Mr. Stainton remarked on the sufferings of certain leaf-mining lepidopterous larvæ. I could mention the absence of many other species, but one other instance will here suffice. I know a mill on the

borders of this county where *Mania maura* occurs in August by hundreds; flying over the water at the head of the mill in the evening, with its peculiar bat-like flight, and resting within the mill by day. I have seen them thus, packed on one another in immense numbers. This year not one has been seen. On the weather-boarding of this same mill I have usually seen and disturbed, in order to witness moth-hawking in its glory by the numerous swifts and swallows, every morning some eight or ten *Catocala nupta*; this year but two have been seen.

Leaving the Lepidoptera, one or two notes on experience of this miserable season amongst the more neglected orders may be instructive. Coleopterists, when industrious, regardless of weather, do not appear to complain of want of success. In an order where life-histories and habits are particularly variable this might be expected. With me but two extraordinary occurrences in this order have been noticed; these were the excessive abundance of *Anchomenus dorsalis* and of *Orchestes alni*. The foliage of most of the elm trees here appeared to be completely scorched owing to the ravages of the *Orchestes* larvæ; it was remarked generally. With the more sun-loving Hymenoptera the experience is just the opposite; this year follows two or three very bad ones, but in 1879 many species and even genera have been quite unnoticed. *Aculeata* generally have found seasons sadly out of joint; certain *Bombi* have been scarce, and I have seen but two wasps, both *Vespa germanica*. Hymenopterous galls have been generally scarce, more especially the willow and sallow sawfly (*Nematus*) species. Other sawflies have varied: to take two well-known garden species as examples; the larvæ of *Nematus ribesii* (the gooseberry grub) have been exceedingly destructive to currant and gooseberry bushes, as they were in 1860, while the cherry- and pear-loving larvæ of *Eriocampa* (*Selandria*) *adumbrata* have hardly made a sign, though usually so abundant. Of these two pests my experience is that *E. adumbrata* always spins its winter cocoon much deeper in the ground than *N. ribesii*; neither change to pupæ till the spring. The Cynipid galls have all been remarkably late in appearance. The first gall I found was that of *Andricus curvator* on June 2nd; the common oak-currant galls of *S. baccarum* were not noticed till 11th June, and the first *Spathegaster* bred on June 16th. In 1878 these galls were common on May 1st, and the *Cynips* occurred generally by

May 25th. Oak-apple day (May 24th) came and went without a possible oak-apple; even the oak-buds themselves did not show. The first specimen of this gall (*Andricus terminalis*) I found was on June 16th; they have been very rare this year, quite a contrast to last. Then (1878) some specimens were full grown as early as May 9th, and in 1874 this happened as early as April 25th. The galls of *Dryophanta divisa*, generally so abundant, are quite absent this year, though the leaf-spangles (*Neuroteri*) are fairly common. Amongst the Hemiptera, *Aphides* and many of the true bugs have been fairly washed away; nearly all species have been very rare; hardly a single instance of destructive (plant-) "louse" attack has occurred; and my prophecy as to *Siphonophora pisi* was happily altogether falsified (Entom. xii., 196), though the peas perished all the same. The troublesome *Thripidae* were first noticed on August 10th, and were only worrying on August 24th; the predaceous *Orthoptera* have doubtless fared well by reason of their food being so easily procurable. *Acrida viridissima* has been common, and *Thamnotrizon cinereus* has been exceedingly abundant. About the middle of June I saw several *Platetrum depressum* here for the first time, and on August 22nd it was quite a glorious sight to see the hundreds of the beautiful Demoiselle (*Calopteryx virgo*) flitting about over the Essex and Suffolk Stour, near its source. The lazy *Limnophilus lunatus* and *L. affinis* have been complete pests; indeed all aquatic insects, as might be expected, have felt but little ill effects from the generally pluvial season, but the floods have very probably tended much to their distribution in localities where in dry years their struggle for existence will be severe indeed. Many of the neglected Diptera, with some few of the smaller Hymenoptera, together with a sprinkling of the larger Ichneumonidæ, such as *Ichneumon sarcitorius*, *Paniscus testaceus*, *Pimpla instigator*, &c., have been quite abundant, and but for them insect-life would truly have been conspicuous by its absence. Great as is the wheat crop failure this year, little, if any, of the damage is attributable to *Cecidomyia tritici* (Entom. xii., 207); the various galls of *C. rosæ*, *C. trifolii*, *C. urticæ*, and *C. persicariæ* have occurred in unwonted abundance, and the larger *Tipulæ* have been especially common and troublesome, through their lethargic habits; the first imago of *Tipula oleracea* occurred on September 5th, and they became generally common from 10th to 12th.

Speaking of 1860 the Rev. O. P. Cambridge remarked that "moisture is less hurtful to spiders than insects in general." (Zool. 7553). This has again been abundantly proved this year. All families of spiders appear to have increased and multiplied astonishingly; one non-entomological acquaintance was quite solicitous for their welfare, seeing the paucity of hexapods on which they were to prey.

Such are a few of the entomological experiences of 1879. Insect economy is so varied that it is hard to assign even probable causes for many of these anomalies; still from such a season there is much to be learned. First, however, we must bear in mind that by reason of the adverse meteorological conditions many species have occurred, though quite unnoticed; absence of sun and presence of rain have been altogether unfavourable for their appearance. Last winter was exceptionally severe, but this, I believe, was rather favourable to insect preservation than otherwise. Severe and continued cold destroys but few species directly. To this end we have had many experiments on eggs, larvæ, pupæ, and imagos. John Hunter found that although insect eggs solidified at 15° Fahr., they were not destroyed. Spallanzini is even said to have subjected these eggs to a cold of 56° below zero, and then found that some hatched. Of larvæ we have numerous instances of their being rendered quite brittle by frost and still surviving; indeed it has been recommended that certain hibernating larvæ be kept throughout the winter in an ice safe to ensure successful rearing. A *modus operandi* in which is great reason. Pupæ also have been repeatedly observed to develop successfully after having been frozen to the consistency of ice, but on this subject Mr. W. H. Edwards' somewhat imperfect experiments on the effect of cold causing a change in form may be referred to (Can. Ent. ix., 203).

Réaumur's experiments on the retardation or acceleration of metamorphosis are well known. Mr. McCook's and numerous other experiments on bees and ants have proved that hibernating imagos readily withstand great cold without any apparent injury. From these facts long-continued cold during the period of hibernation cannot be said to be injurious to insect life in any stage. Sharp winters are preservatives generally; it stays spoliation by birds and numerous other enemies. During mild winters the underground pupæ and hibernating larvæ are easily

found and preyed upon, not so when the surface is covered with snow or frozen hard; though exposed pupæ, &c., are then the more eagerly sought after and obtained. Last winter I had a specimen of *Depressaria Alstræmeriella* in a certain place, which never moved from November, 1878 (it was possibly there somewhat earlier) until April 8th, 1879. Imperfect or disturbed hybernation is always destructive; that is, the application of cold after vitality is resumed by the hybernator is mostly fatal. Of this I have experienced several instances, and it is on this principle the ice-house treatment of hybernating larvæ is recommended. Late and severe frosts after mild weather are far more destructive to insect life than a persistently hard winter. In the 'Entomologist's Weekly Intelligencer' (vol. ii., p. 21), Mr. H. Cooke recorded a curious instance of these injurious effects of sudden cold. He says—"On 10th April, 1857, at two o'clock, the thermometer was 80°, and white butterflies were plentiful; on the 11th, at the same hour, the thermometer was down to 50°, and many butterflies were picked up dead." Wet is, I think, a much greater enemy to insect-life than cold; all breeders of Lepidoptera know the deleterious effects of excessive damp on pupæ. Larvæ also suffer greatly from disease occasioned by excessive moisture in their food. This year, however, great quantities of insects have been actually drowned, although there are people who believe the fact of drowning an insect to be an impossibility. In walking over a twenty-acre field of red clover, on August 20th, I picked up fourteen specimens of *P. gamma* larvæ from the flooded furrows; these were quite hard and distended. I carried them home carefully, but not one recovered. The total destruction of these larvæ in this field alone by the heavy rain must have been considerable.

From the above remarks it will be gathered that the wet summer has altogether had much more effect on insect-life in 1879 than has the severe winter; scarcity of imagos this year, however, will not serve as sufficient data on which to forecast a like scarcity next, though the ungenial pairing-time may have its effects on many isolated species. As in 1860, so in 1879, many lepidopterous larvæ have occurred in unwonted abundance. I could mention many species; in one garden quite a plague of *Arctia lubricipeda*, *A. menthastri*, and *Mamestra persicariæ* had eaten up every green thing, and were feeding on ivy, laurel, and

clematis when I saw them; their numbers must have been enormous. The fact, too, of pupæ remaining dormant through more than one season is every year becoming more established. The different entomological experiences of every season are of interest, and it is this which has induced me to pen these rambling notes.

Maldon, Essex, November, 1879.

ANATOMICAL AND MORPHOLOGICAL RESEARCHES ON THE NERVOUS SYSTEM OF INSECTS.

Translated from the French of M. ED. BRANDT in the 'Comptes Rendus.'

By J. W. SLATER.

THESE researches have been effected on 1032 species belonging to different orders of insects, as well as on a great number of larvæ. They bear upon the metamorphoses of the nervous system in fifty species, and are destined as elements for the comparative anatomy, and especially for the morphology of this part of the organism of insects. The following are the principal novel results:—

1. Certain insects, such as the genera *Rhizotrogus*, *Stylops*, *Hydrometra*, have not a distinct sub-œsophagian ganglion. Hitherto it was supposed that this ganglion was distinct from the following ganglia in all insects, and this character was considered as distinguishing their nervous system from that of the other *Arthropoda*.

2. The "pedunculated bodies" of Dujardin, or the convolutions of the brain, are found not merely in some insects, as hitherto admitted, but in all, in a higher or lower state of development.

3. In certain insects differences in the development of these convolutions are met with, even in different individuals of the same species. This is the case, *e.g.*, among the social Hymenoptera, such as ants, wasps, and bees. The assertion of Mr. Wagner that among bees these parts are found in the females and the workers, but not in the males, is inexact. They are found in the males, not only of bees, but of all insects. Nevertheless, among social species the development of these organs is much less considerable than in the females and workers.

4. In general the development of that part of the brain

known as the hemispheres is proportional to the degree of development of intelligence and of manners, but that of the entire brain is not so.

5. The nerves of the labrum do not, as commonly admitted, issue from the lower surface of the super-œsophagian ganglion.

6. The study of insects having two thoracic ganglia shows that in some the first ganglion is simple, and corresponds to the first ganglion of the larva. The second is compound, resulting from the fusion of two or three thoracic ganglia of the larva with one or two of the abdominal ganglia. This is the case with the Lepidoptera, Coleoptera, Hymenoptera, and Neuroptera. In others both the first and the second thoracic ganglia are compound, the former resulting from the fusion of the first and second thoracic ganglia of the larva. (*Empis*, *Thereva*, *Asilus*, *Bombylius*).

7. The number of ganglia varies not merely in different species of insects, but even in different individuals of the same species. The working bee has five abdominal ganglia, whilst the males and the queen have only four; the working wasp has five ganglia, whilst the males and the queens have six.

8. Hitherto it has been supposed that the last abdominal ganglion is always complex. I have often found that the last but one is formed by the union of several, while the last is simple. (In the working bee, in *Mutilla*, &c.)

9. In certain insects (*Tenthredo*, *Bombus*), there exists in the thorax a sympathetic nervous system whose constitution corresponds to that of the abdomen in these insects.

10. The transformation of the nervous system takes place according to two different types; sometimes it contracts, and the number of ganglia is reduced in the adult (Hymenoptera, Coleoptera, Lepidoptera); sometimes the change follows the inverse direction, that is to say, in the larva there is only one single mass in the centre of the thorax (in addition to the sub-œsophagian ganglion), and this mass is broken up into a variable number of others, as M. Künckel has shown in *Volucella*, and as I have demonstrated in a great number of species (*Eristalis*, *Volucella*, *Stratiomys*, &c.)

11. Comparative researches made on the nervous system of the Hemiptera show that when these insects have only a single thoracic ganglion it corresponds to the two hinder thoracic

ganglia, and all the abdominal ganglia of the larva. The first always coalesces with the sub-œsophagian ganglion. (*Acanthia*, *Nepa*, *Notonecta*, &c.)

12. My researches on the nervous system of the Lepidoptera show that these insects have sometimes two, sometimes three, thoracic ganglia; but that they have always only four abdominal ganglia, as stated by Léon Dufour. In many recent zoological manuals is found the erroneous assertion that Lepidoptera have five abdominal ganglia. According to my researches upon 118 species three thoracic ganglia are found in *Hepialus* only,—a genus containing species many of whose organs resemble those of a chrysalis rather than those of an adult insect.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LEPIDOPTERA AT YARMOUTH AND LOWESTOFT.—During a fortnight's stay in the neighbourhood of Yarmouth, from August 17th to 30th, I had plenty of opportunity of remarking two things—the continued lateness of the season, and the great abundance of *Plusia gamma*. This handsome and ubiquitous insect was on the wing in great numbers: on the sand dunes, where the dandelion and sea-holly formed the chief attraction to its insatiable appetite for sweets, there it was, and in nearly every lane in Suffolk through which I walked. I suppose everyone must have noticed the way the imagines have varied in ground colour this season. I have both bred and seen at large specimens nearly as rosy as *Plusia V-aureum*; and the last imago which emerged from the pupa in my cage was shot with bronzy green. I am happy to be able to add that neither the gardens which I passed nor the hedgerow plants appeared to have suffered seriously from the depredations of the larvæ, but, on the contrary, looked fresher and greener than I have ever seen them before at this time of year, while flowers of all sorts were out in abundance; dock, plantain, and burdock, were the only weeds which showed many traces of their voracious appetites. As several notes have lately appeared in the pages of the 'Entomologist,' which seem to point to a scarcity of other species of Lepidoptera, I venture to append a list of those I observed, from which it will be seen that the lateness of the season continued apparent in Suffolk up to the

date of my departure; and no wonder, for the weather was most unsettled. *Vanessa urticæ*.—Just out, August 18th; not seen after August 22nd. *V. Atalanta*.—Just out, August 29th. *Pyrameis cardui*.—Not very common. *Satyrus Megæra*.—Just out, August 29th. *S. Janira*.—Still coming out when I left, but not common. *S. Tithonus*.—Abundant. *S. Hyperanthus*.—Not so common; nearly over when I left. *Polyommatus Phlæas*.—One or two on the North Denes, August 24th, frequenting sea-holly, in company with *Pyrameis cardui* and *Plusia gamma*. *Macroglossa stellatarum*.—One full-fed larva on the denes near the Yare, on rest-harrow. *Euchelia jacobææ*.—Larvæ not common; only occurring in one lane. *Arctia lubricipeda* and *A. menthastri*.—One small larva of each. *Liparis auriflua*.—Several at rest on twigs. *Orgyia antiqua* and *Bombyx rubi*.—One larva of each. *Odonestis potatoria* and *Selenia illunaria*.—One female of each. *Acidalia scutulata*, *A. trigeminata*, and *Timandra amataria*.—One of each. *Abraxas grossulariata*.—Commoner at rest in some of the lanes than I have ever seen it before in such situations. *Eupithecia centaureata* and *E. coronata*.—One of each at rest on a wall. *Melanippe unangulata*.—One near Bradwell, Suffolk, August 21st. *M. fluctuata*.—Only a few. *Coremia ferrugata* and *C. unidentaria*.—One or two of each. *Camptogramma bilineata*.—Still out, but rare. *Eubolia lineolata*.—Common, and in good condition when I first reached Yarmouth, but very local; confined to a sand dene between the Nelson column and the River Yare. I saw a very handsome dark-banded variety, and managed to obtain eggs; it appeared over by August 30th, but I saw two as late as the 28th. Mr. Wilson, in his work on the British larvæ (p. 128), gives June as the latest month in which this lively little insect appears on the wing. *Bryophila glandifera* and *B. perla*.—A few of each, at Gorleston. *Acronycta psi*.—A few at rest in good condition as late as August 21st. A distinguished looking feminine member of the *Leucaniidæ*, whom I met with one evening on the North Denes among the marram and lyme-grass, and whose sole object in life appeared to be that of digging for herself an early grave in the sand as speedily as possible, seemed to me to be more like *Nonagria elymi* than any other British species. She was gyrating round and round on her head with great velocity, and had already formed a considerable depression in the sand when I came across her. I also saw

a few very worn-out members of the *Miana* fraternity, whose scales were in much too "fishy" a state for me to care to pronounce on their identity. *Agrotis valligera*.—A few on the denes. It is an odd thing to see this insect at rest: it merely depends from the very tip of a blade of grass attached by the ends of its legs, and swayed to and fro by the slightest breeze. Besides the above I may mention that I was much surprised to observe a very fine specimen of a handsome *Vanessa*, to which I cannot attach a name. It was at rest on the trunk of a tree in a plantation, near Lowestoft, with fully expanded wings. It was about the size of *Vanessa polychloros*, and resembled *V. xanthomelas*, as figured in Mr. Kirby's work, now in course of publication (plate 7, fig. 1), in having a shaded greyish border to all the wings; but then the ground colour, so far from being redder than that of *V. polychloros*, was much more delicate and fawn-coloured. Unluckily it was out of reach, and I was without a net (August 18th).—B. LOCKYER; 27, King Street, Covent Garden, W.C., September 8, 1879.

APPEARANCE OF INSECTS DURING THE PRESENT SEASON.—The effects of the ungenial weather upon different species of insects vary greatly. Those which pass the winter in the mature state, such as *Vanessa Io*, *V. urticæ*, and *G. rhamni* appeared this year quite as early as usual. *Anthocharis cardamines*, on the other hand, was in the Aylesbury district a month behind its time, having been seen from the 5th to the 25th June. *Hipparchia Janira* was not seen till July 18th, and *H. Tithonus* not till August 7th. Many of the commonest species, both among Coleoptera and Lepidoptera, are this year conspicuous by their absence. It must, however, be remembered in the Vale of Aylesbury, from the cold, wet character of its soil, and from its height above the sea-level, all periodical organic phenomena are exceptionally late.—C. R. SLATER; 18, Wray Crescent, Tollington Park, N., September, 1879.

LATE LARVÆ OF PYRAMEIS CARDUI.—I have been taking on our cliffs, to-day, what I believe to be the larvæ of *Pyrameis cardui*, some of them very small, feeding on the common mallow (*Malva sylvestris*). I do not think so late a brood has ever before been recorded.—WALTER BLACKALL; 9, Church Street, Folkestone, October 15, 1879.

NOTES FROM THE NEW FOREST.—As there seems to have

been a great deal of interest manifested lately in the Lepidoptera of the New Forest, I wrote to George Gulliver, of Brockenhurst, who collects in the district the greater part of the year, and asked him what his experience had been, as I had not been able to visit the Forest myself. He says that in some parts the larvæ of *Lithosia quadra* (as already noted by several correspondents) were in swarms; the perfect insects, however, were not plentiful. The whole question of the sudden appearance of the *L. quadra* larvæ in such large numbers calls for explanation. It is possible that the damp in the early part of the season may have caused a luxuriant growth of the lichens on which they feed, which both fed and sheltered the larvæ while small; the continued wet, however, probably prevented their pupation, or destroyed them in the pupa state. The fact that such large numbers of insects were bred in confinement from the larvæ taken would seem rather to prove that this was the case. *Calligenia miniata* was fairly abundant, and also *Aplecta herbida*, while *Plusia gamma* swarmed, as it has done in most places. *Catocala sponsa* and *C. promissa* were both scarce; they were also scarce last year, but swarmed the year before that (1877). Two *Acronycta alni* were taken at least, but the rarities seem to have been few and far between. Of *Eulepia cribrum* only two specimens were taken, although in some years it is fairly plentiful in one or two localities. Everything was three or four weeks late in the Forest, and both day-work and sugaring were unproductive. Taking the whole season Gulliver says that it is the worst that he ever knew; one would expect to hear this, but the accounts from some parts of the country are by no means bad. One of our best known collectors of Micros told me, a few days ago, that in spite of the wet he had done better this year than ever before, and I know of others who have fared by no means badly.—W. W. FOWLER; Repton, Burton-on-Trent, November 12, 1879.

ASTHENA SYLVATA.—To-day I have been beating alder between Plym Bridge and Cann Quarry, trying to obtain larvæ of *Asthena sylvata*. After beating several hours I gave it up in despair, not having obtained a single specimen. Ten days since I beat out one, which was full fed and went down on the 14th. Last year I had only one, which was not full fed until the 29th. I then walked to Cann Carn, and in the brake close by, and away from any alder, I commenced beating blackthorn (*Prunus communis*), and

the first stroke brought down *A. sylvata*. After some further labour in the same vicinity I obtained two more. I think this is the first record of its feeding on blackthorn.—G. C. BIGNELL; Stonehouse, September 22, 1879.

CAPTURES AT BOX HILL DURING JULY AND AUGUST.—The little *Phoxopteryx comptana*, generally so common on the slope of Box Hill at the end of May and early in June, was this year conspicuous by its absence; and of *Eriopsela fractifasciata*, usually plentiful in August, I did not see a specimen. The following are the best of my captures:—*Sesia ichneumoniformis*, *Setina irrorella*, *Corycia temerata*, *Retinia duplana*, *Lithosia aureola*, *Eupithecia subumbrata*, *Acidalia ornata*, *Aspilates gilvaria*, larvæ of *Scotosia dubitata* (from which I reared a fine series), larvæ of *Cucullia verbasci* (common) and *C. lychnitis* (rare, on *Verbascum nigrum*), *Pyrausta punicealis*, *P. ostrinalis*, *Botys hyalinalis*, *Spilodes palealis*, *S. cinctalis*, *Scopula ferrugalis*, *Homæosoma binævella*, *Phycis adornatella*, *Rhodophæa consociella*, *R. tumidella*, *Halias quercana*, *Sarrothripa Revayana*, *Tortrix corylana*, *Peronea aspersana*, *Phoxopteryx comptana* (1), *Sericoris conchana*, *S. cespitana*, *Sciaphila pasivana*, *Carpocapsa grossana*, *Semasia rufillana*, *Ephippiphora trigeminana*, *Catoptria hypericana*, *Dicrorampha plumbagana*, *Eupæcilia flaviciliana*, *Cochylis francillana*, *C. dilucidana*, *Coleophora lixella*, *C. onosmella*, *C. discordella*, *Elachista Bedellella*, *E. stabilella*, *Coriscium citrinella*, *Pterophorus acanthodactylus*, *P. baliodactylus*, *P. parvidactylus*, *P. tetradactylus*, *P. phæodactylus*. In June the plants of dropwort (*Spiræa filipendula*) were tenanted by larvæ of *Peronea aspersana* and *Gelechia tæniolella*, the former of which I bred in some numbers in July, the latter sparingly. A *Noctua* larva on the same plant produced, to my great surprise, a fine dark specimen of *Xanthia aurago*, an insect I hitherto believed was confined to beech.—W. MACHIN; 22, Argyle Road, Carlton Square, E., September 25, 1879.

CANTHARIS VESICATORIA.—Referring to Mr. Perkins' note (Entom., p. 274 *ante*), the Spanish-fly, or blister-beetle, is not so rare in this country as some imagine. It is found in several places in the South of England, and may be considered completely naturalised. I took it in abundance from an ash tree (*Fraxinus excelsior*), on the leaves of which it was sunning itself, in the month of June, about four summers ago, in a small wood near

Colchester; and though I have not since looked for it, I have no doubt but that it may still be taken there abundantly at the proper season. It may be of interest to state that the beetle is about three-quarters of an inch in length, and its colour is very beautiful bright metallic green.—GEO. J. GRAPES; 2, Poronall Crescent, Colchester, November 6, 1879.

GRANARY WEEVILS.—If further evidence be wanted of the excessive damage caused by *Calandra* (*Sitophilus*) *oryzæ* and *granaria*, we find it in a recent parliamentary report "On Indian Wheat," by Dr. Forbes Watson. In this instructive and exhaustive report we read:—"As will be seen from the figures noted below, more than one-half of all the samples were found on arrival to be more or less damaged by weevil. Of the 325 samples entered as lost or otherwise unfit for valuation the great majority were found to be unfit for valuation on account of excessive weevilling. Only 497 samples out of a total of 1152 were in a perfectly sound, or at any rate nearly sound, condition." The samples from Bombay and the Central Provinces appear to have been in the soundest condition, while those from Punjab and Sind were more greatly damaged. In tracing the cause of this great deterioration in the samples Dr. Watson clearly tells us that many of them were already weevilled before they left India. "The Bengal samples, for instance, were packed each in a hermetically-sealed tin case, so that no weevil could have found access to them during the voyage, and yet out of 117 samples 70 arrived more or less weevilled." The introduction of comparatively simple screening and dressing machinery, also to a certain extent of the more expensive steam threshing machinery is recommended; for "in this manner," says Dr. Forbes Watson, "one of the greatest obstacles to the development of the Indian wheat trade would be reduced to a minimum." The total production of wheat in India is quadruple that of the United Kingdom, and is also of excellent quality.—EDWARD A. FITCH.

ANNUAL EXHIBITION OF THE HAGGERSTON ENTOMOLOGICAL SOCIETY.—The Eleventh Annual Exhibition of the Haggerston Entomological Society was held at the Society's Rooms, at Haggerston, on the evenings of the 13th and 14th November. There was a large attendance each evening. By far the greater portion of the exhibition was as usual composed of Lepidoptera,

chiefly exhibited by Messrs. Barlow, Harper, Mardle, Southey, Pratt, Clark, Jobson, Meecham, Eedle (sen. and jun.), Raine, Hockett, Franklin, Meek, Smith, Lovell, Booth, Simmons, Trew, Downes, Rose, Pearson, and Gates. The following exhibits may be mentioned as being of exceptional interest:—By Mr. Jobson, a very light variety of *Satyrus Janira*; Mr. Lovell, *Acronycta alni* and *Stauropus fagi*; Mr. E. G. Meek, long series of *Dianthæcia Barrettii*, two *Platypteryx sicula* and larvæ, larvæ and five specimens of *Agrotis Ashworthii*, *Acronycta strigosa*, and *Boletobia fuliginaria*; Mr. Southey, several varieties of *Cidaria russata*, &c.; Mr. E. Franklin, variety of *Scotosia certata*; Mr. Simmons, *Aglossa dimidialis* (imported, taken at the East India Docks) and *Tinea orientalis* (also imported); Mr. Rose, hermaphrodite specimen of *Lycæna alexis*; Mr. Purdy, *Diasemia ramburialis*, *Argyrolepis Mussehlana*, &c.; Mr. Bryant, black variety of *Biston hirtaria* and *Bombyx quercus* var. *callunæ*; Mr J. A. Clark, a fine variety of *Pyrameis cardui*; Mr. T. Eedle, sen., exhibited a large and greatly-admired case of preserved larvæ, representing four families of Lepidoptera, *Diurni*, *Geometræ*, *Nocturni* and *Noctuæ*, and numerous other cases and drawers; Messrs. Hockett, Hillman, Raine and Franklin, also exhibited largely in this branch. The Coleoptera were represented by Messrs. H. Hillman, G. Pearson, and W. J. Vandenburg. Messrs. Pearson and Vandenburg also exhibited small collections of Neuroptera. Mr. H. Hillman, F.Z.S., also exhibited two cases containing coloured plaster-casts of fruit, &c., showing the way in which apples, pears, and various vegetables are attacked by insects. This exhibit was coloured to nature, and had been prepared with great skill. Mr. Hillman also exhibited a case of Hemiptera taken at Epping Forest. Mr. White showed a miniature fern-case, in which had been confined, for upwards of eight months, a common house spider, being fed during the time by hand. It looked very tame and fat, and had spun an immense quantity of white silken web.—W. J. VANDENBURGH, Hon. Sec.

 OBITUARY.

THOMAS CHAPMAN.—Thomas Chapman, so well known as an eminent Glasgow Entomologist, died, at the residence of his son, Dr. T. Algernon Chapman, of Burghill, Herefordshire, on August 27th last. Although born in 1816, in Nottingham, he had

lived so long in Scotland as to be reckoned one of its best naturalists. Few amongst those who had the pleasure of his acquaintance but looked up to him as an authority, not only in Entomology, but in several other branches of science. Probably the City of Glasgow Bank failure cut short Mr. Chapman's life, for by its collapse he lost the whole of his means, being, we believe, a trustee for some other person who held shares in it. He will be greatly missed, for his good nature and ability to impart knowledge made for him many friends.—J. T. C.

NOAH GREENING.—It is with much regret we record the death of the well-known lepidopterist, Mr. Noah Greening, of Warrington. He died at his Douglas residence, Isle of Man, on Thursday, 13th November, 1879, aged fifty-eight years. Having had a severe attack of inflammation of the lungs last February he went to Douglas, hoping the climate would suit him. This was to some extent successful, but he had recently an unexpected relapse, which terminated his life. In the death of Mr. Greening the northern entomologists have to lament the loss of one of their best friends. Of exceeding kindly disposition, and a really hard worker, he was ever ready to help his friends with either knowledge or specimens. As a collector of Lepidoptera he had few equals, for, added to his great energy, he had the faculty of seeing at a glance the most minute differences between species. The genus *Eupithecia* received from him great attention, and in the very fine collection of Lepidoptera left by him this genus is exceptionally represented. But few of our readers can turn to their collections without finding something from Mr. Greening, notably *Acidalia contiguaris*, *Agrotis Ashworthii*, &c. Besides being an entomologist Mr. Greening was a good ornithologist, his mounting of birds being exceptionally good. As a sportsman he was a celebrated shot and a good fisherman. His death again reduces the now small number of names of those once living in Lancashire who made the Northern Entomological Society of such repute, we believe four alone surviving. He was buried at Warrington on the Monday following his death, the town which saw his successful rise to fortune through a fortunate invention for weaving wire by steam power. He carried on that manufacture until a few years ago, but latterly his son has conducted his more active business.—J. T. C.

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